ZYW130-RG Chartless Recorder

User's Manual

SHAOXING ZHONGYI ELECTRONICS CO.,LTD.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1

CHAPTER 2: TECHNICAL SPECIFICATIONS 2

2.1 NUMBERS OF CHANNELS 2
2.2 INPUT 2
2.3 OUTPUT 2
2.4 ACCURACY 2
2.5 RECORD INTERVALS 2
2.6 RECORD CAPACITY 2
2.7 RECORD TIME 2
2.8 SCREEN 3
2.9 POWER SUPPLY 3
2.10 SIZE 3
2.11 NET WEIGHT 3
2.12 CONSERVATION CONDITIONS 3
2.13 WORKING CONDITIONS 3

CHAPTER 3: INSTALLATION AND WIRING 4

3.1 PACKING LIST 4
3.2 SHAPE AND HOLE SIZE 4
3.3 TERMINALS ALLOCATION 5
3.4 WIRING 5
3.4.1 Power wiring 6
3.4.2 Input signals wiring 6
3.4.3 Output signals wiring 6
3.4.4 Thermocouple compensation wiring 6
3.4.5 Communication printing wiring 7

CHAPTER 4: KEYBOARD OPERATION 9

4.1 FUNCTION KEYS 9
4.2 PANEL BUTTONS 9

CHAPTER 5: RUNNING AND CONFIGURATION OPERATION 11

5.1 MENU 12
5.1.1 Main menu 12

5.1.2 Information sub-menu 12
5.1.3 Summary sub-menu 12
5.2 RUNNING SCREEN 13
5.2.1 General view screen 13
5.2.2 Bar chart screen 14
5.2.3 Digital display screen 14
5.2.4 Real time trend 15
5.2.5 Information screen 16
5.2.6 Historical trend 18
5.2.7 Summary screen 19
5.2.8 Adjust screen 21
5.3 CONFIGURATION SCREEN 23
5.3.1 Main configuration screen 23
5.3.2 System configuration 24
5.3.3 Channel configuration 27
5.3.4 AO Channel Set 30
5.3.5 PI sampling range setting 30
5.3.6 Resistor sampling range configuration 30
5.3.7 Alarm configuration 31
5.3.8 Algorithm configuration 33
5.3.9 Display configuration 44
5.3.10 Data backup 45
5.3.11 Data printting 46

Chapter 1: Introduction

Thank you for using ZYW130-RG Chartless Recorder.

The manual provides users solutions of installation, operation, configuration, exception diagnosis, etc. To ensure the stable operation of ZYW130-RG Chartless Recorder, please read the manual carefully before installation and operation, and after that, please keep the manual properly.

ZYW130-RG Chartless Recorder (ZYW130-RG) is a new product developed by Shaoxing Zhongyi Electronics Co.,Ltd. based on a number of key independent core technologies. Taking advantages of its solid technical basis and advanced awareness of science and technology, relying on years of instrumentation development and application experience, and on the basis of investigating the opinions of a wide range of new and old users in different industries, the performance and technical Specifications of the product is in a leading position of the same type of products in China.

ZYW130-RG is a new intelligent recording instrument with an advanced 32-bit CPU, large-scale integrated circuit and graphic LCD display. The interface is information-rich, easy-to-operate and user-friendly:

- Fully isolated universal input, multiple signals input, without modules replacement, and software configuration is accessible.
- Use 32M large-capacity flash memory chip to store historical data, no data lost even power-off occurred.
- Standard serial communication interface: RS-232 and RS-485, Modbus RTU protocol.
- The clipboard copy and paste function can facilitate user parameter settings.
- The bit mark and unit of a project can be configured.
- Four groups of curves, free-form curves match, and the curve color can be customized.
- Equipped with standard USB interface, support USB1.1, USB2.0 disk, support FAT16/32, the historical data transmitting is simple.
- External micro-printer is supported to satisfy the requirement of field printing.

Chapter 2: Technical Specifications

2.1 Numbers of channels

Maximally 16 channels are supported.

2.2 Input

DDZ-II standard signal: 0～5V , 0～10mA
DDZ-III standard signal: 1～5V , 4～20mA(Power distributable)
Low voltage: 0～20mV, 0～100mV
Thermal Resistance: Pt100, Cu50
Thermocouple: B, E, J, K, S, T
Resistance signal: 0～400Ω
Frequency: PI(0～30kHz，High level: 8.5～30V，Low level: 0～4.5V)(Please specify in order if needed)
Digital input signal: DI
Analog output signal: AO
Isolation Impedance: 20MΩ @ 500V

2.3 Output

Current: 4～20mA， Load capacity 750Ω (Maximally)
Communication: RJ-11 communication interface，RS232/485 Protocol，Baud rate: 9600, 19200, 38400, 57600 Optional
USB Interface: Multiple flash disks supported
Alarm: Maximum 6 relay contacts, contact load: 0.5A@125VAC/1A@30VDC

2.4 Accuracy

Real-time display: ±0.2% F.S.;
Curve display: ±0.5% F.S.;
Memory accuracy: ±0.2% F.S.;
Common-mode rejection ratio :> 120 dB;
Series mode rejection ratio :> 50 dB
Note: thermocouple cold-error should be removed.

2.5 Record intervals

11 intervals from 1 to 240 sec.: 1/2/4/8/12/24/36/60/120/180/240sec.

2.6 Record capacity

64/128/192/248MB (FLASH capacity is optional).

2.7 Record time

The record time of every channel is related to the flash memory capacity, number of input and the record interval of the channel, the formula is as follows:

$$\text{Days of record} = \frac{Flash\_capacity(MB) \times 1024 \times 1024 \times \text{Re}cord\_\text{int}erval(\text{sec.})}{Number\_of\_channels \times 16 \times 24 \times 3600}(day)$$

Example 1: Now we have an enhanced integrated instrument, only one channel is configured, the time interval is 60 seconds (select according to section 2.5), and the flash memory is 128MB, please calculate the record time according to these conditions and above formula:

$$Days\_of\_record = \frac{128(MB)\times 1024\times 1024\times 60(\text{sec.})}{1\times 16\times 24\times 3600} = 5825(days)$$

Example 2: Now we have an enhanced integrated instrument, eight channels are configured, the time interval of channel 1～4 are 24 seconds, and the time of channel 5~8 are 1second (According to section 2.5). The flash memory is 64MB; calculate the record time according to these conditions and above formula:

$$\text{Channel } 1\sim 4\text{：Days of record} = \frac{64(MB)\times 1024\times 1024\times 24(\text{seconds})}{8\times 16\times 24\times 3600} = 145.6(\text{days})$$

$$\text{Channel } 5\sim 8\text{：Days of record} = \frac{64(MB)\times 1024\times 1024\times 1(\text{seconds})}{8\times 16\times 24\times 3600} = 6(\text{days})$$

2.8 Screen

5.6-inch true color TFT LCD, high brightness, CCFL backlight, and clear picture

2.9 Power supply

New Switching Power Supply, 85～265VAC, 45～65HZ

2.10 Size

Dimensions: $150\text{mm}\times 150\text{mm}\times 220\text{mm}$

Hole size: $138_0^{+1}mm\times 138_0^{+1}mm$

2.11 Net weight

≤2.5Kg

2.12 Conservation conditions

Temperature: -20 to 60 ℃, avoid sunlight

Humidity: <85% RH (non-condensing)

2.13 Working conditions

Temperature: 0 to 45℃

Humidity: 10%~85% RH (non-condensing)

Chapter 3: Installation and wiring

3.1 Packing list

Before leave the factory, the products are handled by collision prevention packaging, please carefully open the instrument package and check the items inside, if any lack or injury caused by negligence or serious impact founded, please notify local agents or contact us immediately.

Table 3-1 Packing list

No.	Name	Unit	Amount	Remark
1	ZYW130-RG Chartless Recorder	Piece	1	
2	Terminals	Piece	1	The amount is up to model
3	Manual	Piece	1	
4	Installing bar (with M4 screw)	Piece	2	
5	Product certification	Piece	1	
6	Warranty cards	Piece	1	
7	Cold terminal compensator	Piece	1	
8	Communication cables			Optional
9	Communications conversion module			Optional
10	Instrument monitoring management software (CD-ROM)			Optional
11	Micro Printer			Optional
12	Flash disk			Optional

3.2 Shape and hole size

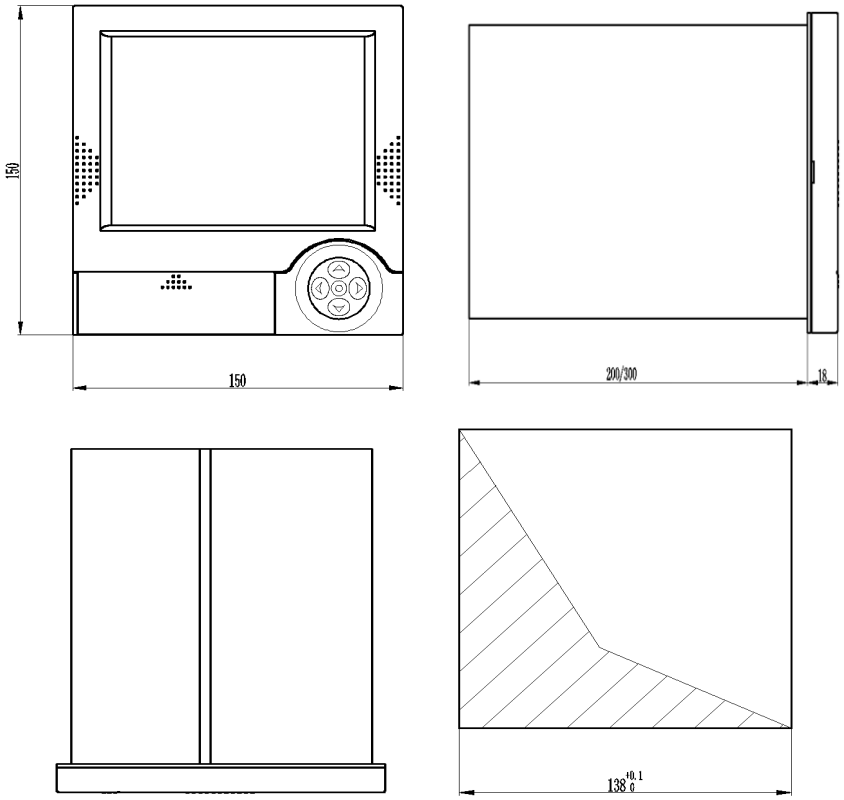


Figure 3.1 the shape and hole sizes of ZYW130-RG

3.3 Terminals allocation

As shown in Figure 3.2: the signal terminals are divided by every four pieces, in accordance to one signal channel. The number before A, B, C, D stands for channel sequence number.

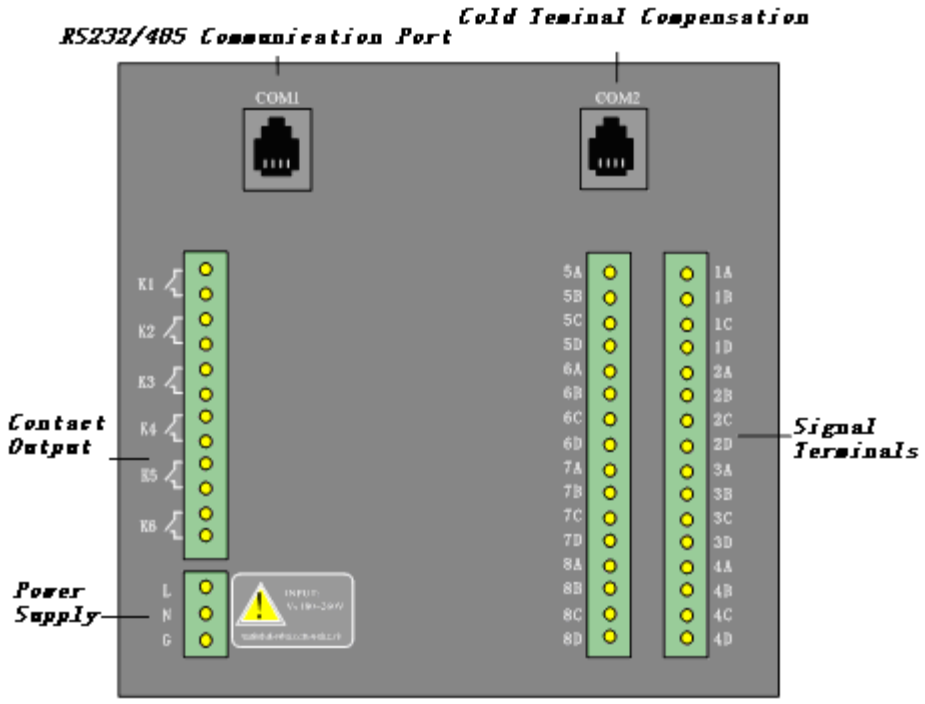


Figure 3.2 the back side terminal allocation of ZYW130-RG

There are two 6-core crystal sockets on the back side of ZYW130-RG Chartless Recorder, one is the communication interface of RS232/485, and the other is the cold terminal compensator of the thermocouple. When there are thermocouple signals, in order to eliminate the influence of environment temperature variation and ensure the accuracy, the cold terminal compensator should be inserted into COM2.

3.4 Wiring

Power supply, input and output terminals use pluggable blocks, which facilitates the day-to-day maintenance on the basis of ensuring good contact. Cold-compensator and communications line use the six core crystal interface.

Notice

The sectional area of the wire: 0.5～2.5mm^2, torque: 50Nm。

3.4.1 Power wiring

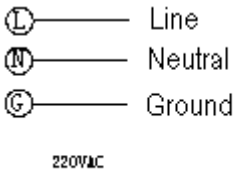


Figure 3.3 Power wiring

3.4.2 Input signals wiring

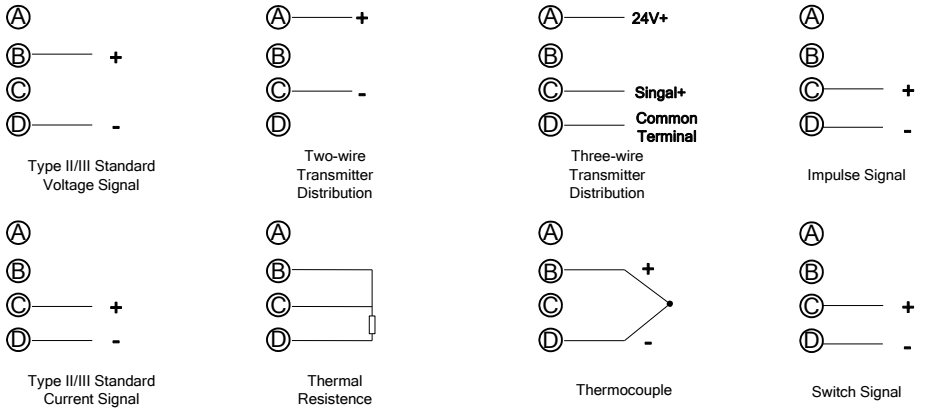


Figure 3.4 Input signals wiring

Notice

The types of input signals still need to be configured by software. Please refer to section 5.3.3.

3.4.3 Output signals wiring

Figure 3.5 Output signals wiring

3.4.4 Thermocouple compensation wiring

If thermocouple signal exists in the input signals, in order to take more accurately cold compensate to the thermocouple, together with the features of our company's products, we add some explains in the definition of thermocouple wiring as following, and the wiring picture is shown in Figure 3.6

1. Connect the thermocouple compensation wire to the attached two-core terminal adapter, and then use ordinary wire to connect the recorder terminals, the length of ordinary wire is 50 cm;

2. Extend 50 cm to the attached cold end compensator, and connect it to the cold end compensator port (COM2);

3. Make the cold end compensator as close as possible to the two core terminal adapters;

4. Connect the cold end compensator and re-power, so that the cold end compensator can work.

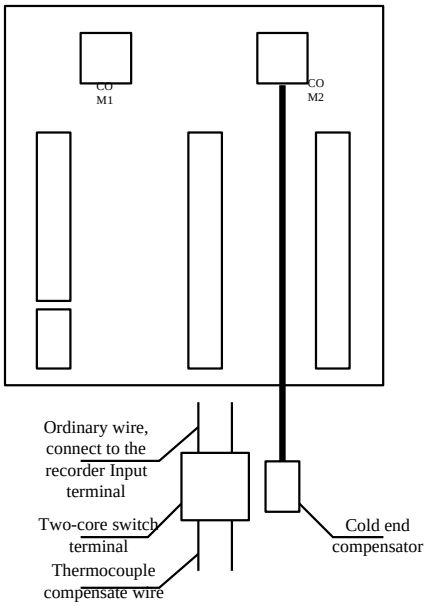


Figure 3.6 Cold-end compensator wiring

Notice

After the cold-end compensator is connected, the instrument has to be re-powered.

3.4.5 Communication printing wiring

True color chartless recorder provides RS232 or RS485 communication interface, they are all fetched out from the backside COM1 of the instrument, when communicates with PC, the interface definition is like figure 3.7 and table 3-2.

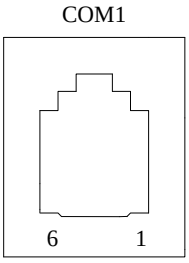


Figure 3.7 Communication interface

Table 3-2 the definitions of communication interfaces

COM1	
Pin	Definition
1	RS232 receiving data RXD
2	RS232 sending data TXD
3	RS485 communicating 485-(B)
4	--
5	RS232 signal ground GND

6	RS485 communicating 485+(A)

The type of RS485 communication wire is shielded twisted pair (provided by the user), the length of RS232 communication wire is generally not more than 10 meters, and the length of RS485 communication wire is generally not more than 1000 meters. During the communication of RS485, under the condition that the wire length is more than 100 meters, the end terminal matching resistor with resistance of 120 ohm should be added (provided by the user) at the farthest two ends of the communication line.

If use the communication wire and accessories provided by our company, the RS232 connection between computer or printer is as shown in Figure 3.8, and RS485 connections are shown in Figure 3.9.

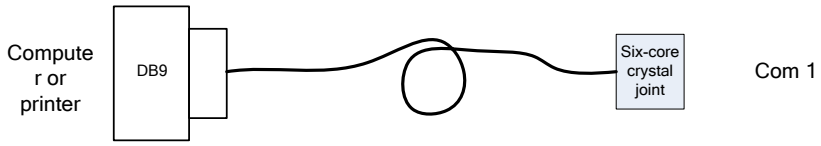


Figure 3.8 Communication or printer connection

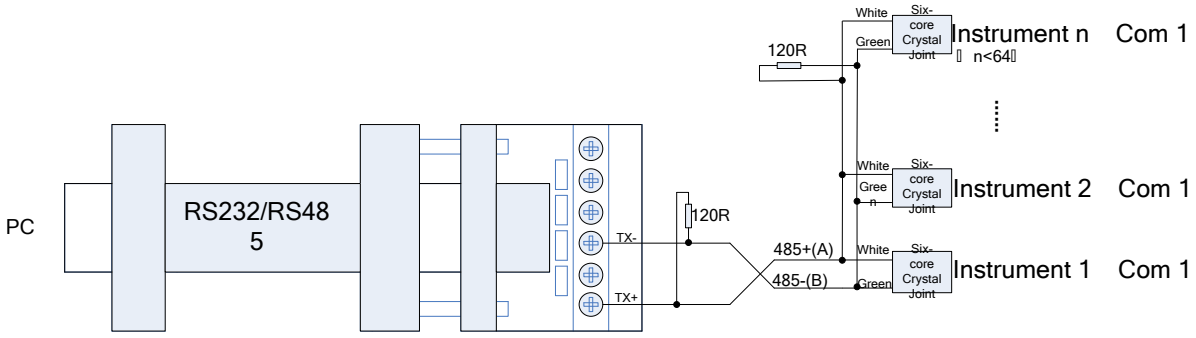


Figure 3.9 Communication connection

Notice

When use RS232 function, provide 1.5 meters of communication wire, one end connects to the 6-core crystal joint, and the other end connect to DB9 joint.

When use RS485 function, provide 1.5 meters of communication wire, one end connects to the 6-core crystal joint.

Chapter 4: Keyboard operation

There are two types of operation keys, one is function keys, and the other is panel buttons.

4.1 Function keys

There are four function keys in total, located under the left-down cover board of the instrument panel. Softly press the cover board and release, the cover board will be opened, and you can see the function keys. The specific functions refer to table 4-1

Table 4-1 the functions of function keys

Description / Symbol	Function	
	Operating status	Configuration status
F1	Open and run the main menu	Exit the configuration screen
F2	1. shortcut to the bar chart screen 2. next page 3. switch manual/automatic adjustment	1. Copy 2. Save 3. Print
F3	1. shortcut to the digital display screen 2. previous page 3. save the adjustment parameters	1. Paste 2. Stop
F4	1. shortcut to the real-time trend screen 2. looping display the curves group screen 3. switch memory methods 4. erase alarming or power-off record	

4.2 Panel buttons

The five panel buttons are located the right-down of the instrument; the allocation is shown in figure 4.1. According to the running status, the function of each key is different. Specific functions refer to table 4-2

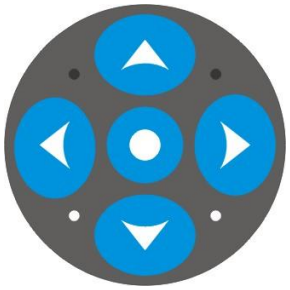


Figure 4.1 panel keyboard

Table 4-2 the functions of panel buttons

Description / Sym-bolls	Functions	
	Operation mode	Configuration mode
	1. check the previous historical data in the normal memory mode; move the cursor forward in the locating memory mode 2. move up to choose alarm record 3. move the cursor forward	1. move the cursor forward 2. switch the input method
	1. check the next historical data in the normal memory mode; move the cursor backward in the locating memory mode 2. move down to choose alarm record 3. move the cursor backward	1. move the cursor backward 2. switch the input method
	1. switch channels upward 2. increase the parameters of the adjustors 3. increase PID adjustment parameter 4. increase time label 5. increase the memory time	1. choose previous option or increase number 2. move the cursor up in the location label modification picture
	1. switch channels downward 2. decrease the parameters of the adjustors 3. decrease PID adjustment parameter 4. decrease time label 5. decrease the memory time	1. choose next option or decrease number 2. move the cursor down in the location label modification picture
	1. open and run the main menu screen 2. affirm current operation 3. vanish or display curves 4. alarm to affirm	affirm current operation
	Switch to the configuration mode	

Chapter 5: Running and Configuration Operation

The display screen of ZYW130-RG Chartless Recorder is mainly the configuration screen and running screen. The display area of the screen is divided into three parts: the status bar, the main display area (setting), operation bar, as shown in Figure 5.1 and 5.2.

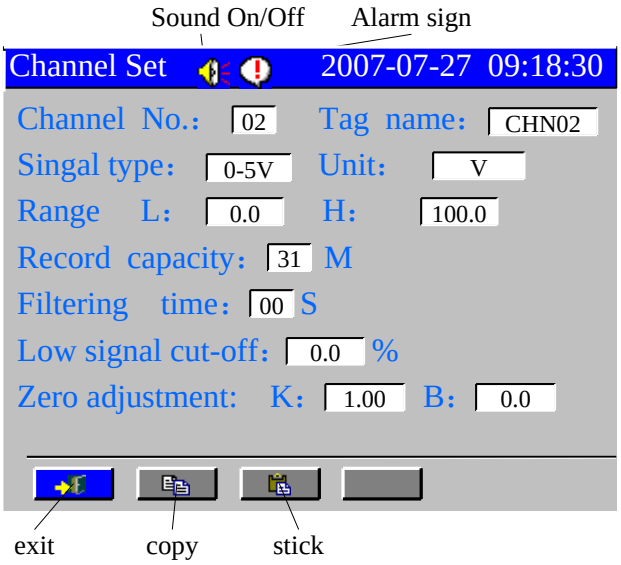


Figure 5.1 Setting screen

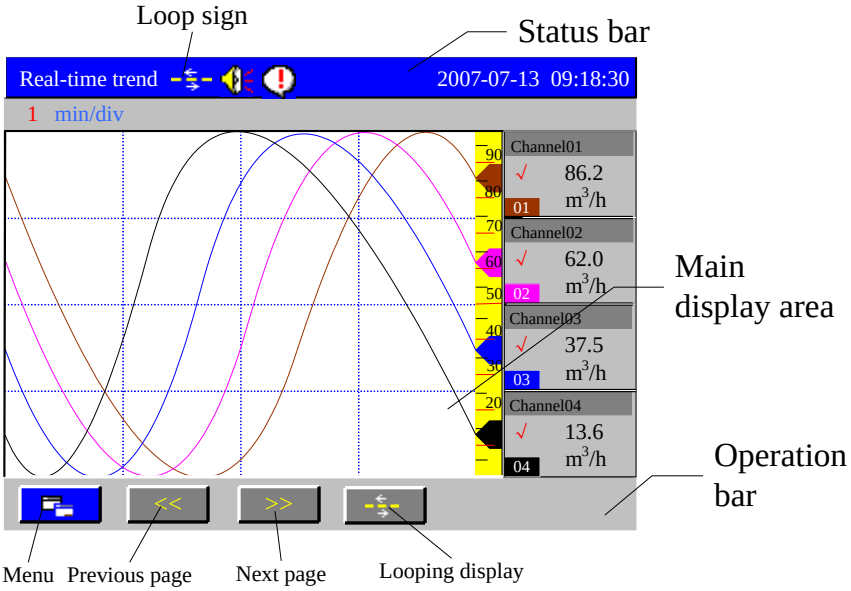


Figure 5.2 operation screen

- The unified status bar is used for displaying the screen name, button sound sign, alarm sign, recycling display sign and current system time, all records and internal operations are based on the time.

- The setting screen is used for setting the instrument in accordance with different display; the main display area is used for monitoring and observation by digital chart, bar chart, curve chart according to different display.
- If alarm happened in the channel, the alarm sign displayed on the status bar, after the alarm cancelled, the sign disappear.

5.1 Menu

5.1.1 Main menu

Under any running screens, move the cursor to [menu] and press button or [F1] button, the main menu will be displayed in the center of the screen, as shown in Figure 5.3

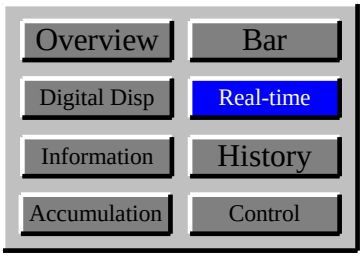


Figure 5.3 menu bar

1. press , , or , , to move cursor to different buttons in the menu bar
2. press to enter corresponding running screen

5.1.2 Information sub-menu

Under the main menu, move cursor to Information Screen, and press to enter the information sub-menu.

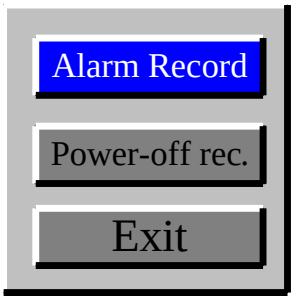


Figure 5.4 Information sub-menu

1. Information sub-menu selection
   1. press , , or , , to move the cursor to “alarm record” or “power-off record”;
   2. press to affirm, the instrument will enter corresponding screen
2. Exit option
   1. press , , or , , to move the cursor to “Exit”;
   2. Press to affirm, the instrument will exit the sub-menu.

5.1.3 Summary sub-menu

Under the main menu, move the cursor to the “summary screen”, press to enter information sub-menu.

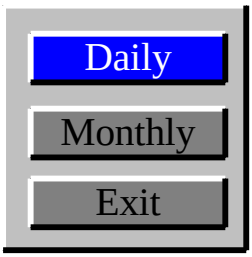


Figure 5.5 Summary sub-menu

1. Summary sub-menu selections
   1. press , or , to move the cursor to "Daily summary" or "Monthly summary";
   2. press to affirm, the instrument will enter corresponding screen
2. Exit
   1. press , or , to move the cursor to "Exit"
   2. Press to affirm, the instrument will exit the summary screen.

5.2 Running screen

ZYW130-RG Chartless Recorder has seven basic running screens and three optional running screens. The seven basic running screens are general view screen, bar chart screen, digital display screen, real time trend, information screen (alarm records, power-off records), historical trend screen. If the instrument opened the "summary calculation" and "PID" method, then there will be additional daily summary, monthly summary and adjustment screen.

5.2.1 General view screen

General view screen can display all the measuring points in the same screen, as shown figure 5.6.

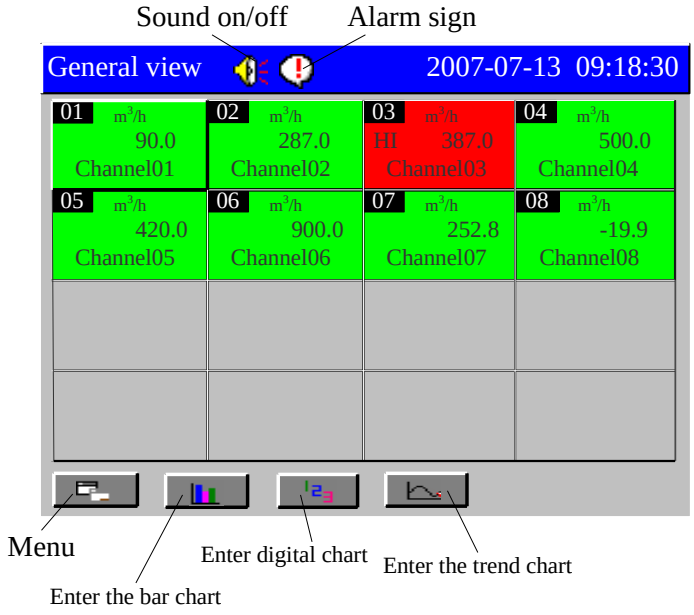


Figure 5.6 VPR130-RG eight channels general view

The information displayed in the general view includes date, time, sound on/off sign, alarm sign, etc. The information for each channel includes channel No. project unit, project capacity

and location label.

When alarm happened in a channel, the background color turns to be red and alarm sign is displayed upon the status bar, after the alarm canceled, the background color turns back to be green and the alarm sign disappeared.

1. [Menu]: enter the menu-bar screen to switch the screen, and for the specific operations refer to section 4.2
2. [Enter the bar chart screen]: Enter the bar chart screen of the curve group where the cursor points to
3. [Enter the digital display screen]: Enter the digital display screen of the curve group where the cursor points to
4. [Enter the real time trend screen]: Enter the real time trend screen of the curve group where the cursor points to

5.2.2 Bar chart screen

The bar chart screen displays the bar chart of two curves group, which gave users a comprehensive understanding of the quality of each channel, as shown in figure 5.7:

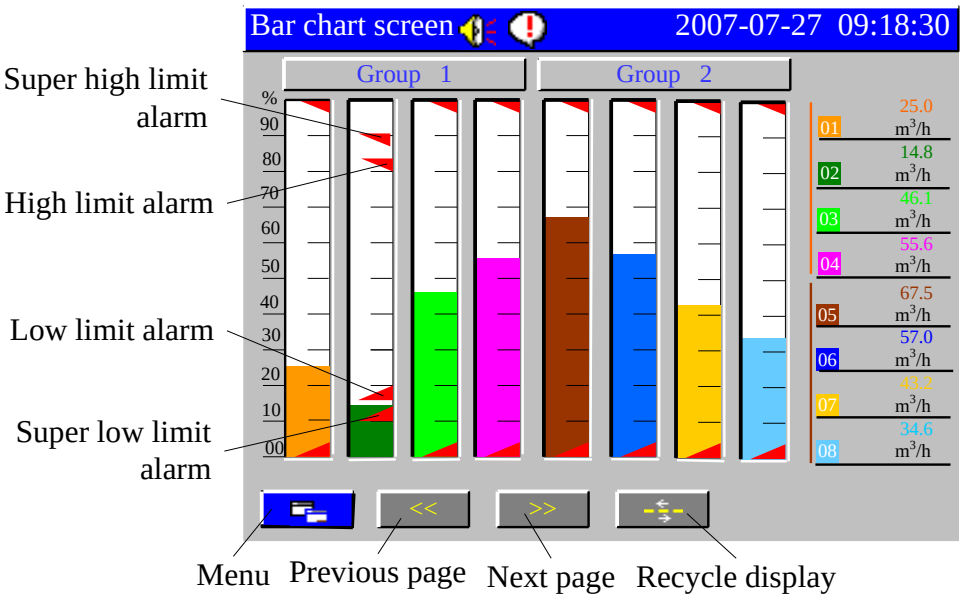


Figure 5.7 eight channels screen

The bar chart screen has the triangle cursor which is used for displaying alarm limits, users can judge whether alarm happened by the relative locations of bar chart and triangle cursors.

1. [Menu]: enter the menu-bar screen to switch the screen,. The specific operations refer to section 4.2
2. [Previous page]: display previous bar chart;
3. [Next page]: display next bar chart;
4. [Recycle display]: recycling display each bar chart screens according to the automatic recycle circle switch configuration

5.2.3 Digital display screen

The digital display screen can display the channel values of a curve group in one screen; the information includes Channel Label, location label, project amount, project unit, as shown in figure 5.8:

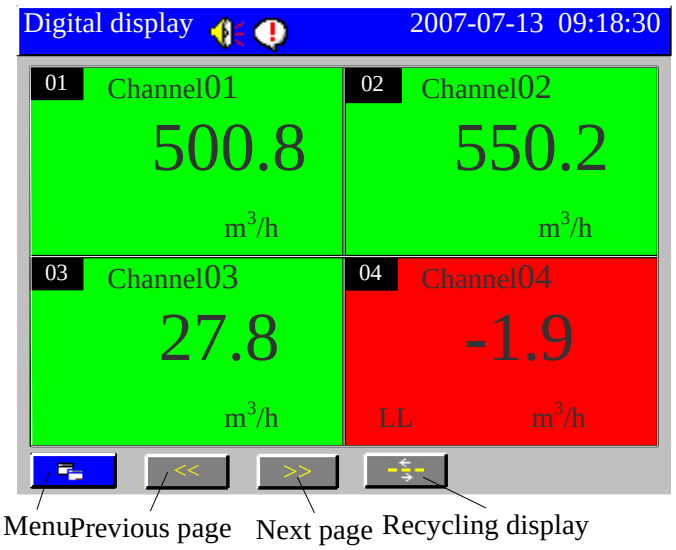


Figure 5.8 the digital display screen of one curves group channels

1. [Menu]: enter the menu-bar screen to switch the screen. The specific operations refer to section 4.2
2. [Previous page]: display previous digital chart;
3. [Next page]: display next digital chart;
4. [Recycle display]: recycling display each digital chart screen according to the automatic recycle circle switch configuration

5.2.4 Real time trend

The content in real time trend screen is mainly the curves of a curve group channel. The information includes date, time, time label, location number, project amount, Channel number, project unit, curve display sign, etc. as shown in figure 5.9:

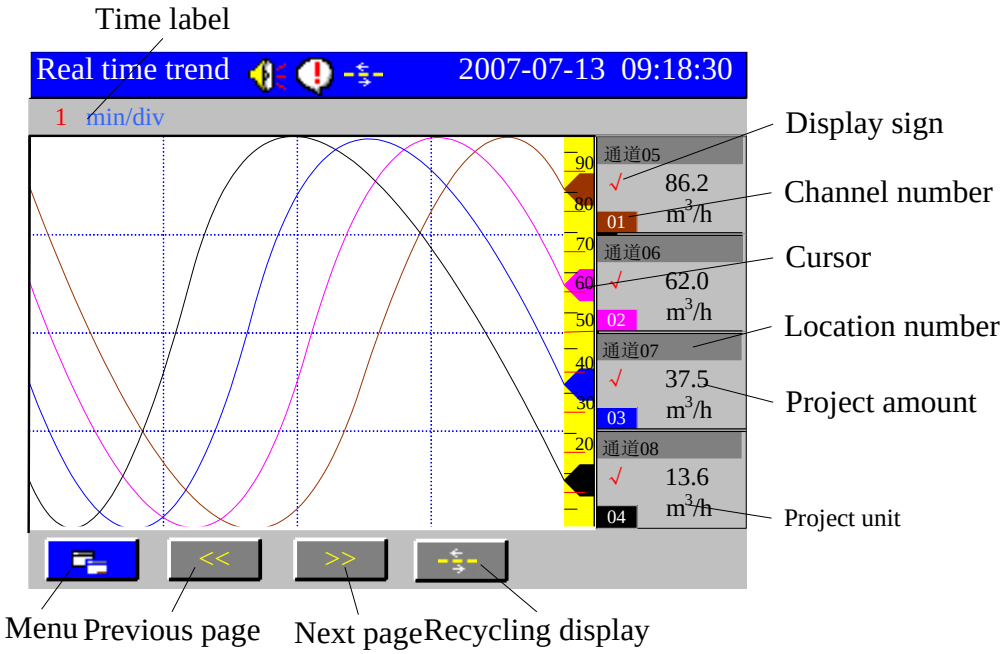


Figure 5.9 Real Time Trend Screen

1. “Time label”: the time length of each grid
   1. press or to move the cursor to the “Time label”;
   2. Press or to select time label.
2. The display of curves
   One screen of real-time trend can display the curve and data of maximum four channels. When user needs to check one or more channels more clearly, they can use appearance configuration to configure. Specific operation:
   1. press or to move the cursor to the “display sign” of the channel to be configured;
   2. press to select:” √”: display, ”×”: No display.
3. Function keys
   1. [menu]: enter the menu-bar screen to switch the screen. The specific operations refer to section 4.2
   2. [previous page]: display previous real-time trend chart;
   3. [next page]: display next real time trend chart;
   4. [recycle display]: recycling display each digital chart screens according to the automatic recycle circle switch configuration

5.2.5 Information screen

Information screen includes two parts: alarming record, power-off record.

5.2.5.1 Alarming record

As shown in figure 5.10, the alarming record screen can display 8 latest records of date, time and type for all the channels or single one, totally 24 alarming records can be saved, and displayed by three screens. In which there are four types:

HH: Extra high alarm

HI: high alarm

LO: low alarm

LL: Extra low alarm

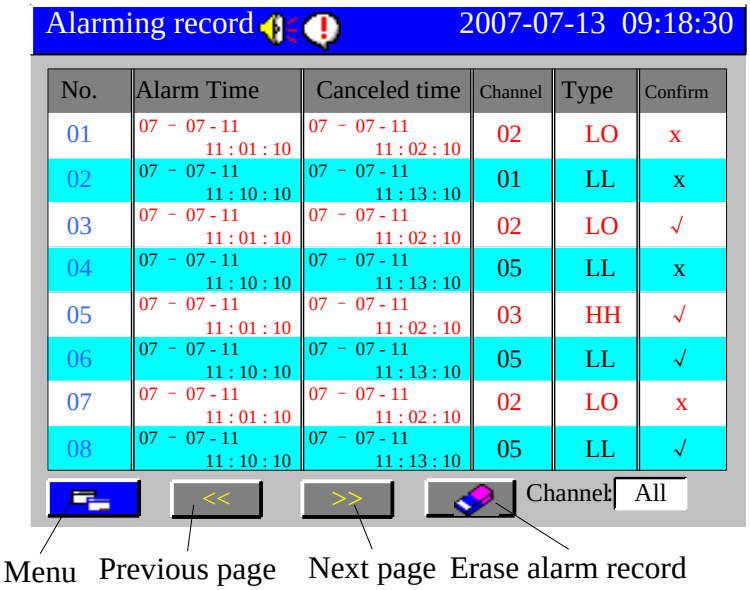


Figure 5.10 Alarm Record Screen

1. Channel
   Press or to select Channel Label or “all”;
2. Select alarm
   1. In the “confirm queue” press to move up the selected alarm record;
   2. In the “confirm queue” press to move down the selected alarm record;
   3. press to confirm the record
3. Function keys
   1. [Menu]: enter the menu-bar screen to switch the screen. The specific operations refer to section 4.2
   2. [Previous page]: display previous eight records;
   3. [Next page]: display next eight records;
   4. [Erase alarm records]: enter the password as shown in figure 5.11. The operation of erasing records is as following:
      a) press or to move the cursor to the input space and input password;
      b) after entered correct password, press to confirm, the password sign turns from” “to” “;
      c) press or to move the cursor to[Exit], press to return the alarm records screen;
      d) in the alarm records screen press or[F4]to erase the alarming records;

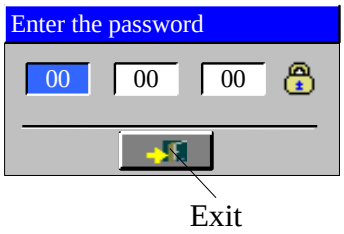


Figure 5.11 Password Input Dialogue

5.2.5.2 Power-fail record

As shown in figure 5.12, the power-fail screen can display eight power-fail records, totally 24 records can be saved.

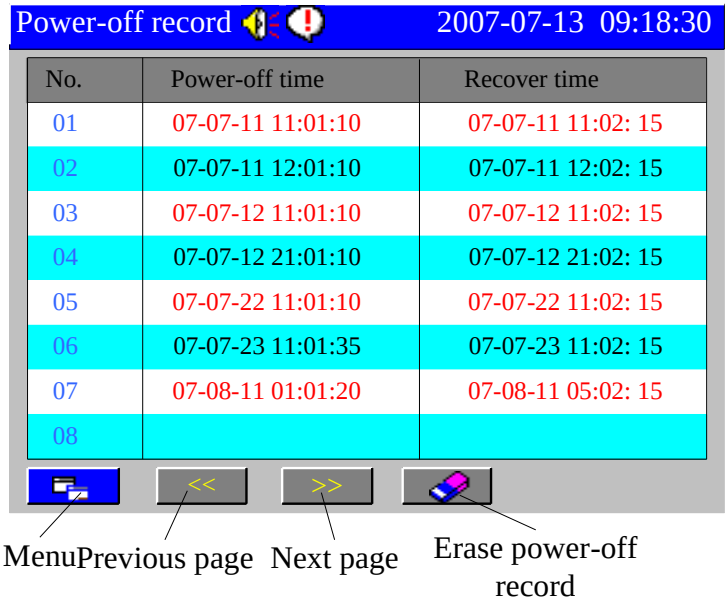


Figure 5.12 power-off record screen

1. [Menu]: enter the menu-bar screen to switch the screen. The specific operations refer to section 4.2
2. [Previous page]: display previous eight records;
3. [Next page]: display next eight records;
4. [Erase power-off records]: enter the password input dialogue, The operation of erasing records is the same as “Erase alarm records”

5.2.6 Historical trend

The historical trend screen can observe, analyze and compare the recorded historical data of all channels. The memory screen can display the history curves for four channels of a curve group, as shown in figure 5.13, 5.14.

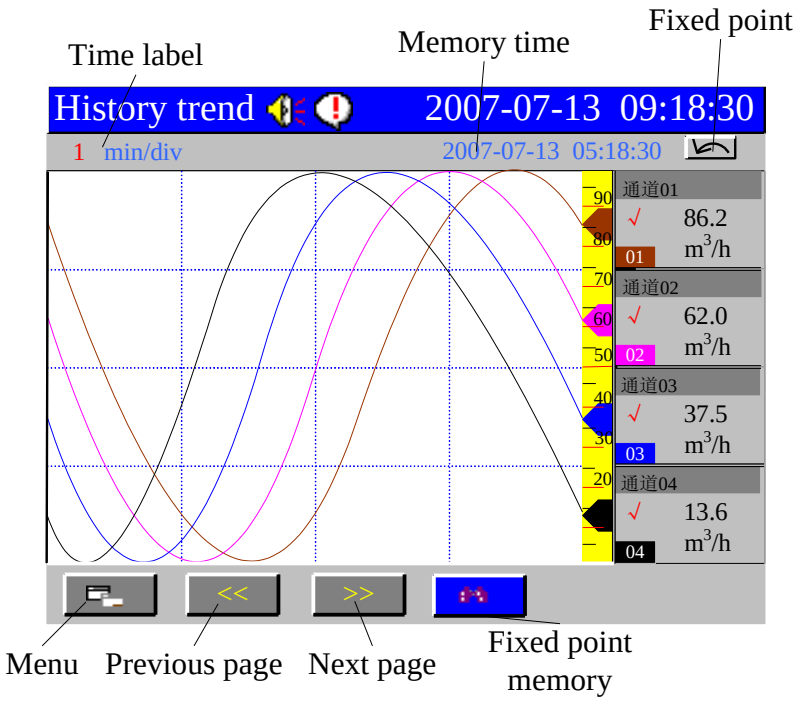


Figure 5.13 History trend screen: fixed point memory

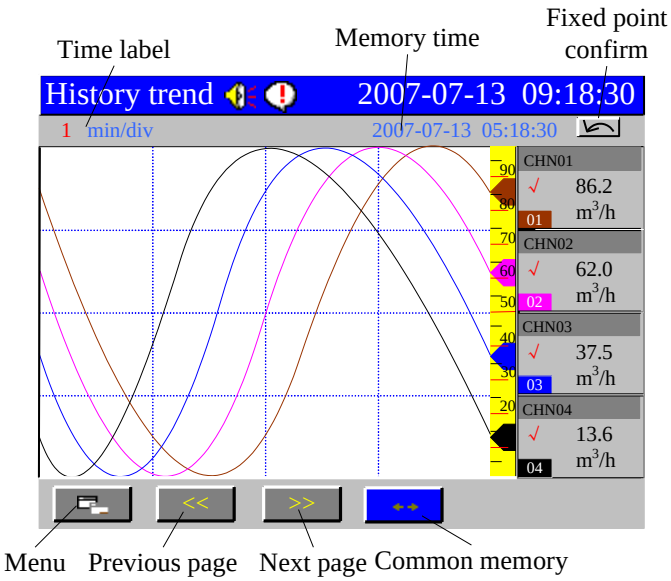


Figure 5.14 History trend screen: common memory

In history trend screen, you can only modify time label, whether to display in fixed point mode.

"Time label": the time length of each grid

1. press or to move the cursor to the "Time label";
2. Press or to select time label.

1. "Memory time": means the rightmost time of the curve
2. "Fixed point memory confirmation"

When the memory mode is fixed point memory, the user has set up the memory time, and press or to move the cursor to"fixed point memory confirmation", press to confirm, the screen will display a curve before the time set

3. Function keys
   1. [Menu]: enter the menu-bar screen to switch the screen. The specific operations refer to section 4.2
   2. [Previous page]: display previous real-time trend chart;
   3. [Next page]: display next real time trend chart;
   4. [Memory mode switch]: switch the memory mode:
      a) Fixed point memory: When the icon of [F4] is "Fixed point memory", press or to move the cursor to "memory time" and set time. The specific operation refers to"fixed memory confirmation"; curve disappear operation refers to the operation of Real time trend screen;
      b) [Common memory]: When the icon of [F4] is "Common memory", the cursor can not be moved. Single click, the curve will move forward a "time label"; single click, the curve will move backward a "time label"

5.2.7 Summary screen

The summary screen include two parts: daily summary and monthly summary

1. daily summary

   The function of daily summary is to display daily summary of current month, so that the user can clearly control the produce status of current month, as shown in figure 5.15:

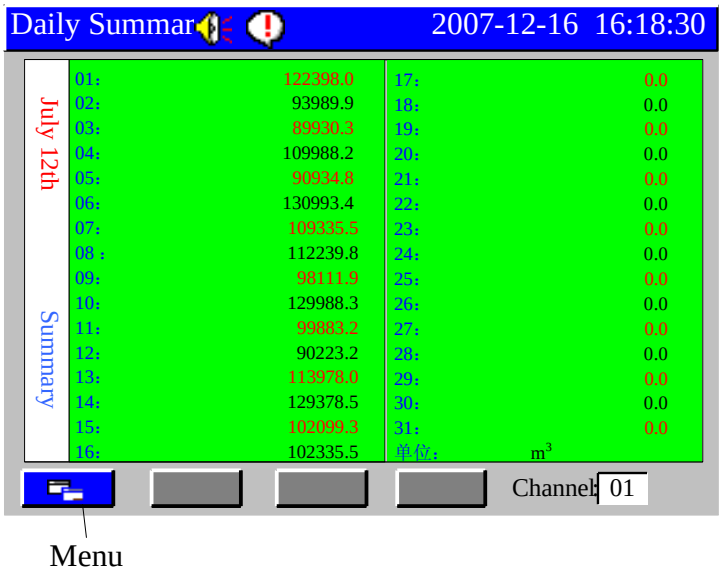


Figure 5.15 Daily summary screens

Notice

When it comes to next month, all the summary records will be deleted, if necessary, please make backup.

- Channel

  Press or to select channel

- Exit

  Press [F1] or move the cursor to [menu] and press to enter menu bar to switch the screen,. The specific operation refers to 4.2 menu bar screen.

2. Monthly summary

   The function of monthly summary is to display monthly summary and total summary of current year, so that the user can clearly control the produce status of the year, as shown in figure 5.16:

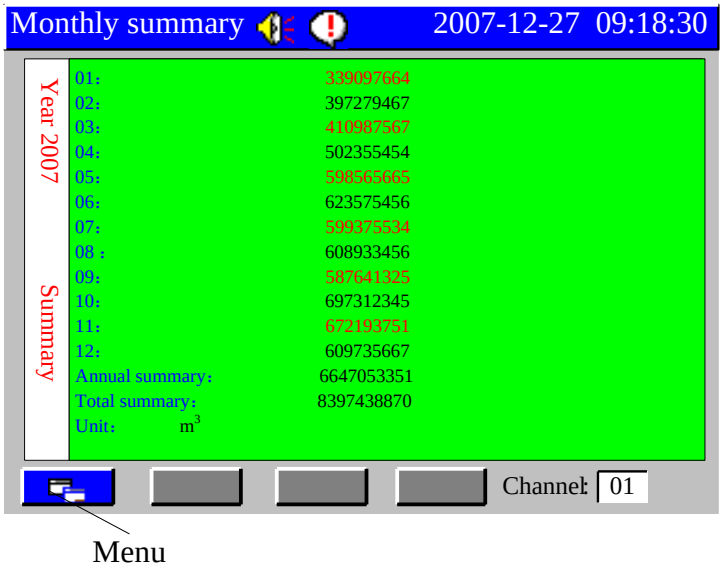


Figure 5.16 Monthly summary screens

Notice

When it comes to next year, all the summary records will be deleted, if necessary, please make backup at the end of the year.

- Channel

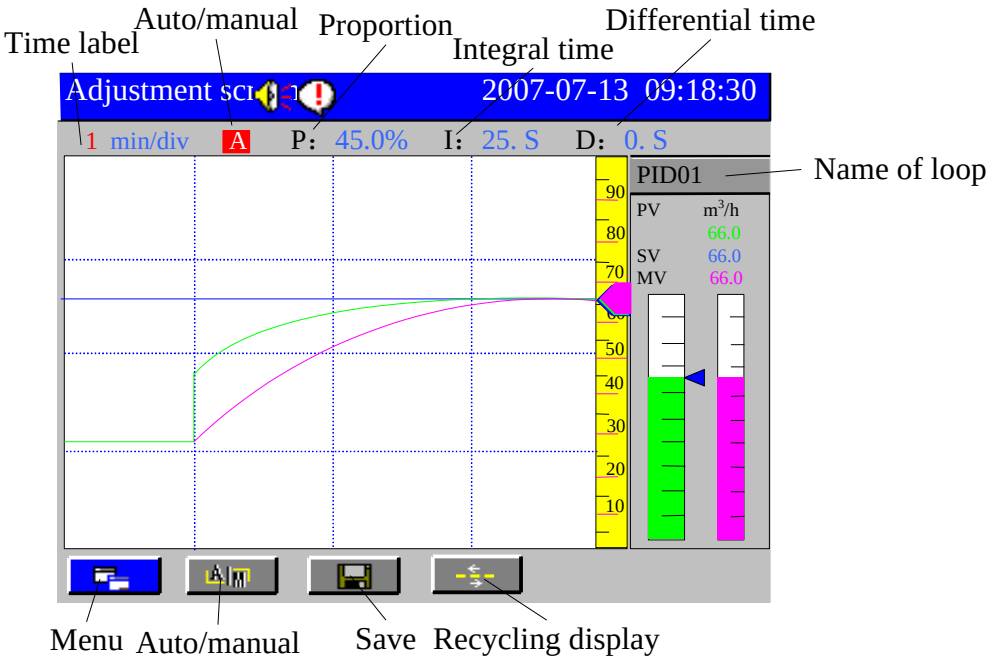
  Press or to select channel

- Exit

  Press [F1] or move the cursor to [menu] and press to enter menu bar to switch the screen, specific operation refers to 4.2 menu bar screen.

5.2.8 Adjust screen

If instrument opened control function, and PID configuration allows PID algorithm, then the user can enter the adjust screen to observe the sample real time curve, configure curve and operation curve (the curve color, according SV, PV, MV color is the same as the bar chart, as shown in figure 5.17:



3. “Time label”: the time length of each grid
   1. press or to move the cursor to the “Time label”;
   2. Press or to select time label.
4. Loop name

   When it allows multiple PID loops in PID configuration, you can select different loop here.
   1. press or to move the cursor to the “Loop name”;
   2. Press or to select the loop.

   When the “Parameter modification” is set as”allow”, the parameters can be modified.
5. Proportion coefficient P

   Refers to the proportion coefficient P in PID control loop, range from 0.1%~1000.0%. The bigger the coefficient is, the stronger the function will be, which will make the system more sensitive and faster, vice versa. But if the coefficient is too big, the system will become unstable.
   1. press or to move the cursor to the “Proportion coefficient”;
   2. Press or to select the Proportion coefficient P.
6. Integral time I

   The integral time ranges from 1~9999, the smaller the stronger, which will make the system unstable, but also can eliminate the stable error and increase the control accuracy, vice versa. When the time turns to 9999s, the integral will not work.
   1. press or to move the cursor to the “Integral time I”;
   2. Press or to select the Integral time.
7. Differential time I

   The differential time ranges from 1~9999, it will strengthen the dynamic characteristic of system, the bigger the differential time is, the stronger differential function will be. The time is in proportion to the amount, so the value should be proper.

1. press or to move the cursor to the “differential time D”;
2. Press or to select the differential time D.

Table 5-1 Recommended values for P,I and D(for reference Only):

System	P	I(s)	D(s)
Temp.	170%～500%	180～600	30～180
Flux	100%～250%	6～60	
pressure	140%～330%	24～180	
Fluid level	130%～500%		

8. Settings

When the PID configuration is inner configure and automatic adjustment, the user can modify the value of SV by keyboard; the range of SV is in the range of sample channel. Otherwise SV can not be changed.

1. press or to move the cursor to SV;
2. Press or to configure the value.

> **Notice**
> The value is displayed by project value, the range is up to the input signal and displayed by percentage, range from 0.0 to 100.0%.

9. Operating value

In PID manual modify mode, the user can modify MV by keyboard.

1. press or to move cursor to MV;
2. press or to configure MV;

10. Function keys

1. [Menu]: enter the menu-bar screen to switch the screen. The specific operations refer to section 4.2
2. [A/M switch]: if the parameters are allowed to be modified, and switch to manual mode, the cursor jumps to MV; otherwise it jumps to SV;
3. [Save]: save the configured PID parameters;
4. [Loop display]: If the system has more than one PID loop, the adjustment of PID loops will be recycling displayed.

5.3 Configuration screen

ZYW130-RG Chartless Recorder owns seven configurations screens, include system configuration, channel configuration, alarm configuration, algorithm configuration (include summary algorithm, flux algorithm, PID algorithm and transfer algorithm), display configuration, data backup and data print screens.

Under any running screen, press and simultaneously it will enter the configuration screen. After correct password setting you can enter other configuration screens.

5.3.1 Main configuration screen

Under any running screen, press and simultaneously it will enter the main configuration screen, as shown in figure 5.18.

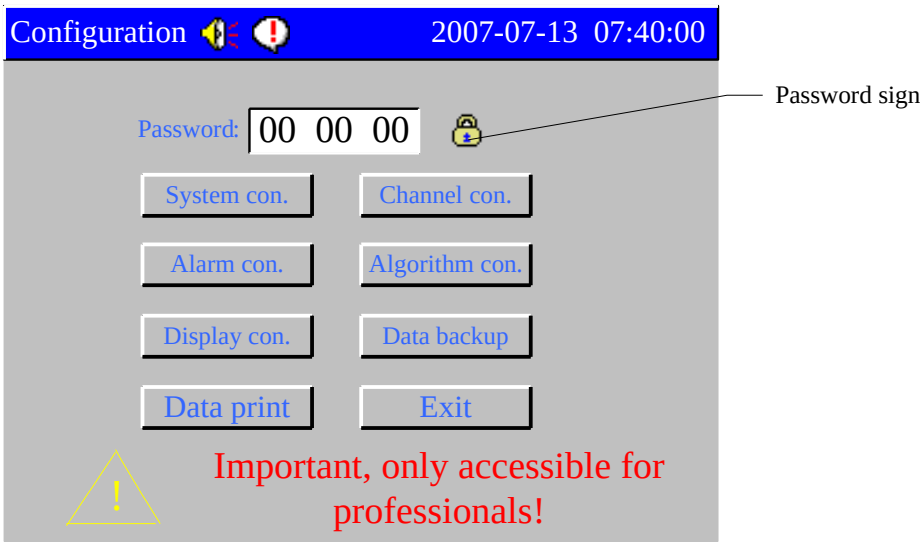


Figure 5.18 main configuration screens

The configuration uses level-menu structure, includes functions such as system configuration, channel configuration, algorithm configuration, display configuration, password input.

5. input the password

1. press or to move the cursor to "password";
2. press or to input password;
3. press to confirm

Notice

If the password is correct, press, the sign turns from" " to" ", then you can access the next level, the password is three two-digit number, the default password is "000000".

Long press or can increase the speed of inputting password.

6. Enter the child menu

1. Press or to move the cursor to related location
2. Press to confirm to enter next level of menu.

7. Exit configuration

1. Press or to move the cursor to "Exit", press to confirm or directly press [F1], to exit the configuration screen.
2. After exit, the instrument will enter the general view screen.

5.3.2 System configuration

As shown in figure 5.19, the system setting screen is used for the setting of system parameters, such as system time, user password, record interval, TC cut-off,RTD cut-off, communication mode, baud rate, local address, control parameters modifying, cold-end compensationg, sound of pressing buttons, restore default setting, etc.

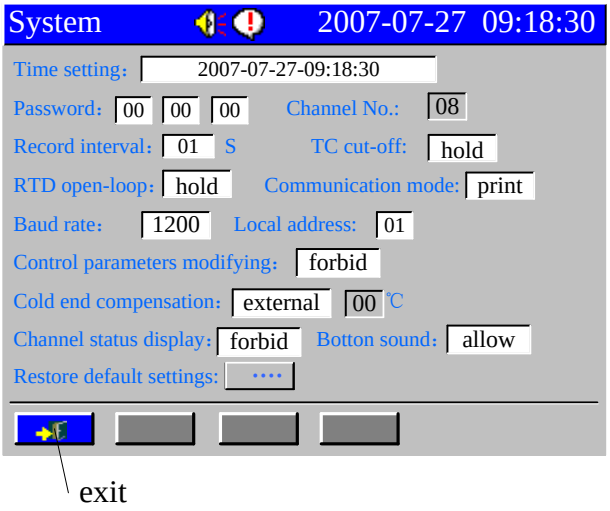


Figure 5.19 System Configuration Screen

- Time setting

If the system time is different from actual time, please correct the system time as follows:

1. Press or to move the cursor to "time setting"
2. Press or to configure system date and time.

A. Password

If the administrator needs to control access, the password can be set as follows:

1. Press or to move the cursor to "user password"
2. Press or to configure user password.

B. Channel No.

It means the number of opened channels, modification is not allowed.

C. Record interval

The record interval can be set as 1/2/4/8/12/24/36/60/120/180/240 seconds. The longer the interval is, the longer the record time is, vice versa. In general conditions, if the signal varies fast, the interval should be set smaller, vice versa. If the record interval of channel data needs to be modified, it can be done as follows:

1. Press or to move the cursor to "record interval"
2. Press or to configure record intervals.

D. TC cut-off

TC cut-off means when the thermocouple cut-off happened, what will be the indicator of the recorder, the lower limit of the measuring range (starting point), keep the data before cut-off (remain) or upper limit (ending point), in order to stabilize production and help workers to find mistakes.

1. Press or to move the cursor to "TC cut-off"
2. Press or to set starting point, remain or ending point.

- RTD open-loop

RTD open-loop handling means when the thermo-resistor cut-off happened, what will be the indicator of the recorder, the lower limit of the measuring range (starting point), keep the data before cut-off (remain) or upper limit (ending point), in order to stabilize production and help workers to find mistakes.

1. Press or to move the cursor to “RTD open-loop”
2. Press or to set starting point, remain or ending point.

- Communication mode

  The communication modes include printing and RS485. (Hardware support needed)

  1. Press or to move the cursor to “communication mode”
  2. Press or to select print or RS485

- Baud rate

  1. Press or to move the cursor to “communication mode”
  2. If the mode is “print”, baud rate is N/A.
  3. If the mode is “RS485”, baud is available by selecting or.

- Local address

  Local address is used as the identification when the instruments are used to form a network. The host computer access the instrument by the address, and its location is 0 and can not be changed. In one communication network, the local address varies from 1 to 63, and an address can not be repeated.

  1. press or to move the cursor to “local address”
  2. Press or to select

- Control parameters modifying

  1. Press or to move the cursor to “Control parameters modifying”
  2. Press or to select. When selecting “allow”, PID can be modified in the adjust screen; selecting “forbidden” doesn’t allow the modification.

- Cold end compensation

  1. press or to move the cursor to “Cold end compensation”
  2. Press or to select. When selecting “external”, temperature can not be modified; selecting “set” and press or to move the cursor to the right of “set”, press or to configure the temperature;

- Channel status display

  1. press or to move the cursor to “Channel status display”
  2. Press or to select. When selecting “allow”, the channel status will be displayed in the general view; by selecting “forbidden” it doesn’t display.

- Button sound

  1. Press or to move the cursor to “Button sound”
  2. Press or to select. When selecting “allow”, the sound sign will be displayed in the status bar of running screen and configuration screen; by selecting “forbidden” it will display the forbidding sign.

- Restore default settings

  1. Press or to move the cursor to “Restore default settings”
  2. Press to confirm.

> **Notice**
>
> After the default settings are recovered, all the recorded data is deleted and settings are disabled. Please be careful!

- Function key

  [Exit]: exit the system configuration screen;

5.3.3 Channel configuration

As shown in figure 5.20, the channel set screen is used for setting parameters of each channel, such as signal type, Tag name, unit, range limits, record capacity, filter time, Low signal cutoff, Zero adjustment, etc.

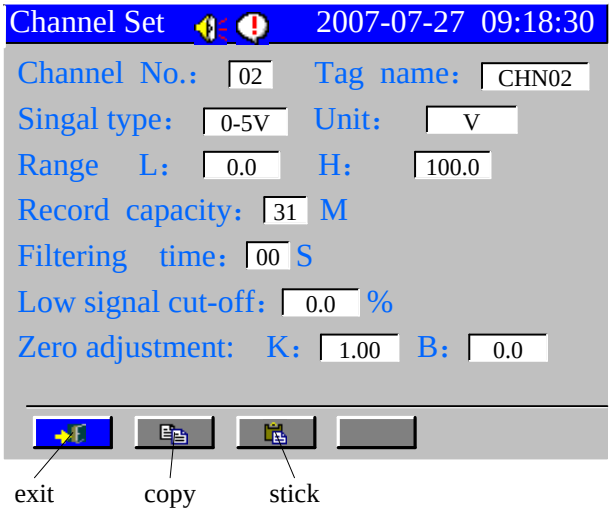


Figure 5.20 Channel setting screen

- Channel No.

  It's up to user's configuration, maximum 8 channels.

  1. Press or to move the cursor to "Channel No."
  2. Press or to select.

- Tag name.

  1. Press or to move the cursor to "Tag name".
  2. Press to confirm and enter location No. modification screen. Specific operation refers to 5.3.7.

- Signal type

  The instrument supports multiple signal types, in which analog signal supports universal input, needless to change module when change different signal types, only need to change the wiring of terminals and set according signal types. The supported types are:

  Type II: 0～5V, 0～10mA

  Type III: 1～5V, 4～20mA

  Small signal: 0～20mV, 0～100mV

  Thermo-resistor: Pt100, Cu50

  Thermocouple: B, E, J, K, S, T

  Frequency: 0～30KHz

  Resistor: 0.0～400.0Ω

  Digital input: DI

  Analog output: AO, 5.3.4 specific configuration refer to 5.3.4

  For frequency signal or digital input signal, hardware support is needed. When user orders the instrument, the input signal type has to be selected as PI or DI.

  1. Press or to move the cursor to "signal type"
  2. Press or to select according signal types

3. In PI type, press to enter "PI sample range setting screen", referring to 5.3.5. If resistor type is selected, press to enter "resistor sample range configuration", referring to 5.3.6.

Notice

When you set the signal type, you have to notice to make it in accordance with the signal of testing component. If the field signal isn't included in the supported signals, please make it clear in the order, our company could add new signal type according to user's requirement.

- Project unit

The following units are available for users:

Nm3/h, m3/h, m3/min, m3/s, L/h, L/min, L/s, t/h, t/min, t/s, kg/h, kg/min, kg/s, ℃, Pa, kPa, MPa, kgf/cm2, Bar, mmH2O, mmHg, %, ppm, pH, r/min, mm, Hz, kHz, mA, A, kA, mV, V, kV, VA, kVA, W, kW, MW, Var, kVar, MVar, J, kJ, uS/m, uS/cm, kg, J/kg℃, kWh, ug/L

1. Press or to move the cursor to "project unit"
2. Press or to select.

If user needs to define new project unit, then press or to select project unit so that the "…" sign appeared on the right, as shown in the left picture of figure 5.21, press to enter the definition screen, as shown in right of figure 5.21.

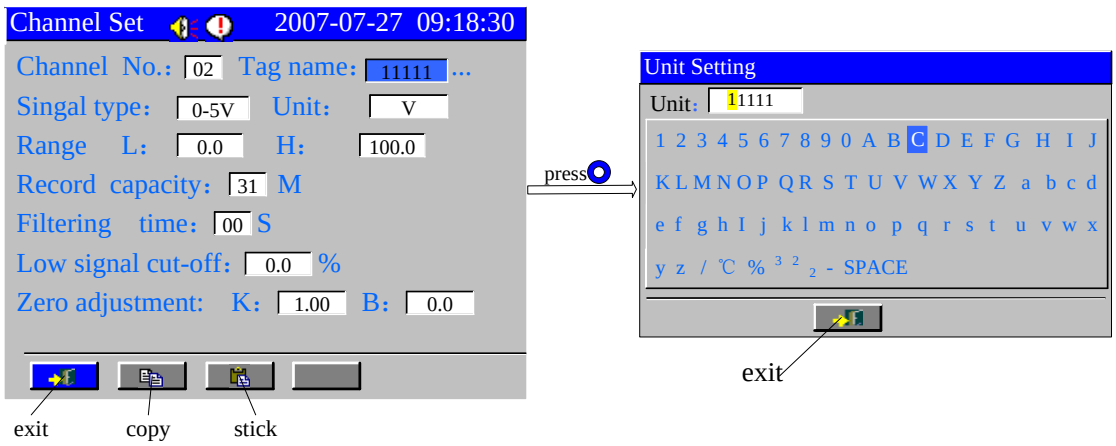

Channel Set
2007-07-27 09:18:30
Channel No.: 02 Tag name: 11111 ...
Singal type: 0-5V Unit: V
Range L: 0.0 H: 100.0
Record capacity: 31 M
Filtering time: 00 S
Low signal cut-off: 0.0 %
Zero adjustment: K: 1.00 B: 0.0
exit
copy
stick
press
Unit Setting
Unit: 11111
1 2 3 4 5 6 7 8 9 0 A B C D E F G H I J
K L M N O P Q R S T U V W X Y Z a b c d
e f g h I j k l m n o p q r s t u v w x
y z / ℃ % ³ ² ₂ - SPACE
exit

Figure 5.21 user definition unit screens

1. Press or to move the cursor to the modifying bit of the "unit"
2. Press or to move the cursor to "unit selection area";
3. Press or to select unit.
4. Press to confirm the unit, and meanwhile the cursor move to next bit.
5. Repeatedly do (3), until all the units are set.
6. Press or to move the cursor to [Exit], and press to exit.

- Lower measuring limit

1. Press or to move the cursor to "lower measuring limit"
2. Press or to configure the lower measuring limit

- Upper measuring limit

1. Press or to move the cursor to "upper measuring limit"

2. Press or to configure the upper measuring limit

> **Notice**
>
> Long press or, the variation speed of input will be become faster; press can modify the number of decimal digits.

After engineering conversion, the decimal precision will be four digits for signal type of II, III and 0～20mV, 0～100mV, which is -999.～9999. the decimal digits can be 0, 1, 2 or 3; the engineering of Pt100, Cu50 and thermocouple signals could be 1 or 0 digit decimal fraction, the upper and lower limitation refers to following:
Type B Thermocouple: Upper limit<1820, Lower limit >250, no decimal fraction
Type Thermocouple: Upper limit <1000, Lower limit>—148, no decimal fraction
Type J Thermocouple: Upper limit <1200, Lower limit>—148, no decimal fraction
Type K Thermocouple: Upper limit <1370, Lower limit>—148, no decimal fraction
Type S Thermocouple: Upper limit <1760, Lower limit>—50, no decimal fraction
Type T Thermocouple: Upper limit <400.0, Lower limit>-40.0, 1 digit decimal fraction
Type Pt100 thermal resistance: Upper limit <850, Lower limit>-99.9, no decimal fraction
Type Cu50 thermal resistance: Upper limit <150.0, Lower limit>-50.0, 1 digit decimal fraction

- Record Capacity

  In general, the record capacity was set before leaving the factory, needless to be re-configured. If necessary, follow the steps:

  1. Press or to move the cursor to “record capacity”
  2. Press or to increase or decrease to required capacity

- Filter time

  Filtering can help to increase the smooth of signals, range from 0 to 99 seconds, the longer the smoother, but slower.

  1. Press or to move the cursor to “filter time”
  2. Press or to increase or decrease to required value

- Low signal cut-off

  The range of cutting off is 0-10.0%. It’s useful when the measuring value is small, so that the error is relatively big; the accuracy will decrease quickly, so in engineering, it is treated as zero.

  1. Press or to move the cursor to “Small signal cut-off”
  2. Press or to increase or decrease to required value

- Zero adjustment

  Do linear transformation Y=Kx+b, x is the sample value

  1. Press or to move the cursor to “zero adjustment”
  2. Press or to change the value of K and b.

> **Notice**
>
> The record capacity can not be copied.

- Function key

  1. [Exit]: exit the system configuration screen;

2. [Copy]: After user set the configuration information, if the configuration information of other channels is same, then the button can copy that.
3. [Paste]: after the Channel Label was set, then it can be copied to current channel.

5.3.4 AO Channel Set

If "AO" is selected in signal types, then the screen will be as shown in figure 5.22:

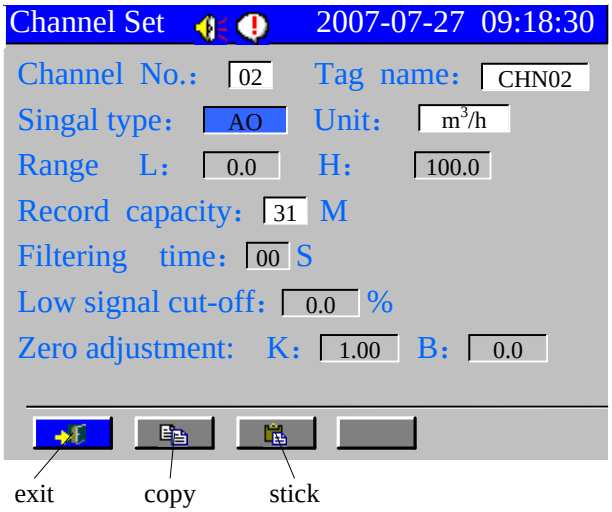


Figure 5.22 AO Channel Set Screen

5.3.5 PI sampling range setting

If "PI" is selected in the signal types of channel configuration (hardware support needed), and the cursor is on it, as shown in the left picture of figure 5.23, press key to enter PI sampling range setting screen, as shown on the right of figure 5.23.

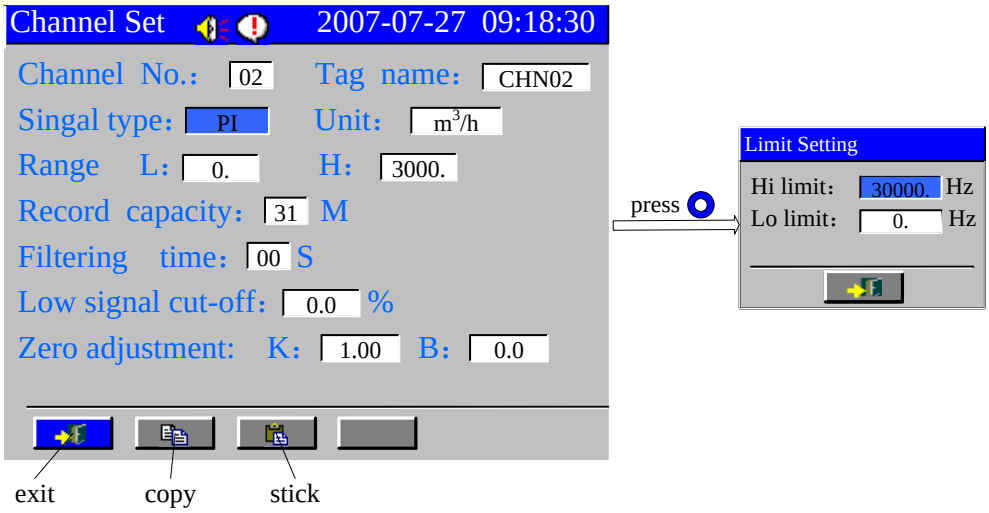


Figure 5.23 PI sampling range setting

1. Press or to move the cursor to "upper sampling limit" or "lower sampling limit".
2. Press or to set.

5.3.6 Resistor sampling range configuration

If "resistor" is selected in the signal types of channel setting, and the cursor is on it

like the left picture of figure 5.24, press key to enter PI sampling range setting screen, as shown on the right of figure 5.24.

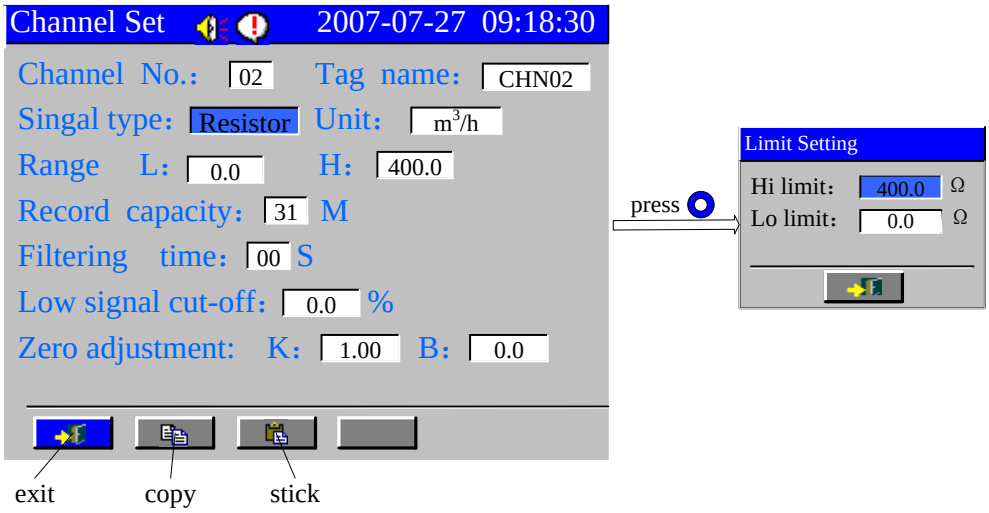


Figure 5.24 resistor sampling range setting

1. Press or to move the cursor to "upper sampling limit" or "lower sampling limit".
2. Press or to configure.

5.3.7 Alarm configuration

As shown in figure 5.25

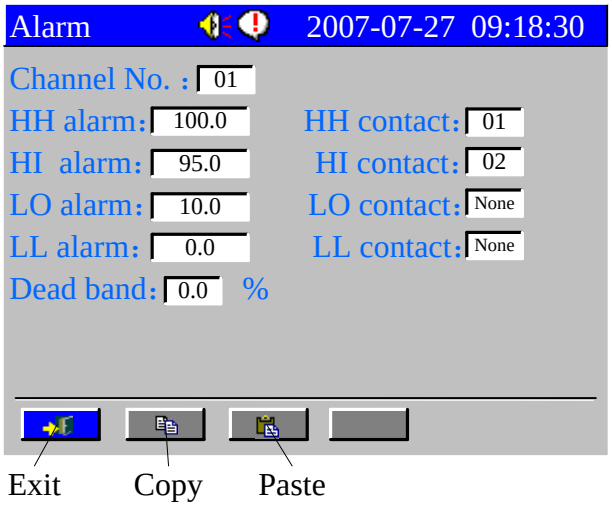


Figure 5.25 alarm configuration Screen

1. Channel No.
   The number is based on user configuration, maximum 16 channels
   1. Press or to move the cursor to "Channel No."
   2. Press or to select.
2. Super high alarming HH: value
   1. Press or to move the cursor to "value" of alarm HH
   2. Press or to increase or decrease to the desired value.

Notice

Press or , the variation will be faster.

3. Super high alarming HH: trigger
   1. Press or to move the cursor to “contact” of alarming HH
   2. Press or to select corresponding trigger number.

Notice

The contact has options of 1~12 and “none”. If selecting 1-12, when the signal exceed the pre-configure alarm value, the corresponding relay will be trigged. If selecting “none”, no matter the signal exceeds the limitation or not, the relay will not take action, but in the alarm summary there is still a record.

4. High alarming HI: value
   1. Press or to move the cursor to “value” of alarm HI
   2. Press or to increase or decrease to the desired value.
5. High alarming HI: trigger
   1. Press or to move the cursor to “contact” of alarm HI
   2. Press or to increase or decrease to the desired trigger value.
6. Low alarming LO: value
   1. Press or to move the cursor to “value” of alarm LO
   2. Press or to increase or decrease to the desired value.
7. Low alarming LO: trigger
   1. Press or to move the cursor to “contact” of alarm LO
   2. Press or to increase or decrease to the desired trigger value.
8. Super low alarming LL: value
   1. Press or to move the cursor to “value” of alarm LL
   2. Press or to increase or decrease to the desired value.
9. Super low alarming LL: trigger
   1. Press or to move the cursor to “contact” of alarm LL
   2. Press or to increase or decrease to the desired trigger value.

Notice

Alarm configurationAlarm configurationAlarm configuration must be setted as following: Lower limit≤LL≤LO<HI≤HH≤Upper limit;
Each channel can occupy maximum four triggers. Each trigger can be occupied by different channels at the same time. Then the relationship between the state of trigger(result)and alarm state(condition)is logically “OR”. For instance, the alarm for two channels is selected as trigger 1, if any one of these two channels was alarmed, trigger 1 will be closed.

10. Alarm dead band

The range of alarm dead band is 0-10.0%. It is used to avoid the frequent occurrence

or cancel resulted from the variation of measuring value of input.

1. Press or to move the cursor to “Dead band”.
2. Press or to select the value.

11. Function keys
    1. [Exit]: exit the alarm configuration screen.
    2. [Copy]: copy the alarming information. If other channel’s alarm configuration is the same as this channel, press this key can copy the configuration.
    3. [Paste]: after copied a channel, than it can paste it to current channel.

5.3.8 Algorithm configuration

The algorithms in ZYW130-RG Chartless Recorder include accumulation algorithm, flow algorithm, PID algorithm and transferring algorithm. As shown in figure 5.26, press or , or to move the cursor,, press to select corresponding algorithm.

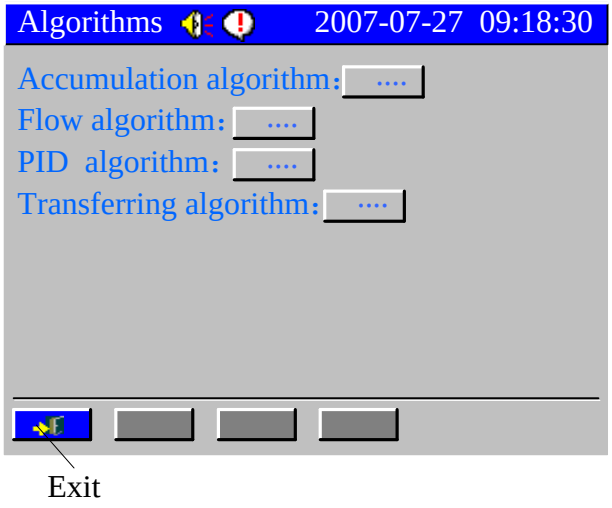


Figure 5.26 algorithm configuration

5.3.8.1 Accumulation algorithm

As shown in figure 5.27:

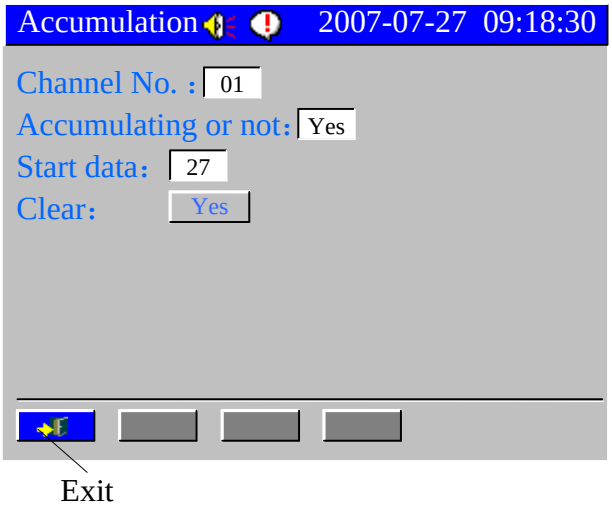


Figure 5.27 Accumulation configuration

1. Channel No.

The function decides whether to calculate the flux of channel according to time.

1. Press or to move the cursor to “Channel No.”;
2. Press or to choose “Yes” or “No”.

2. Start date

Starting date is the date start to calculate the sum; default setting is current year and date.

1. Press or to move the cursor to” start date”
2. Press or to select.

> **Notice**
>
> The first time to use summary, you have to set a starting date. If it is already correct, you still need to re-configuration, in order to initialize the date.

3. Clear the record

Clear all the previous records; include daily record, monthly record, annual record and total record.

1. Press or to move the cursor to” Clear”
2. Press or to confirm.

4. Exit

Press or to move the cursor to [Exit] and press to confirm or press [F1] directly

5.3.8.2 Flow algorithm

As shown in figure 5.28

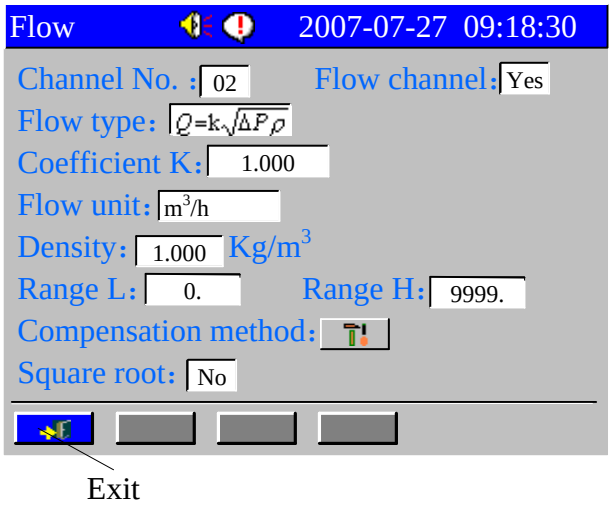


Figure 5.28 Flow configuration

1. Flow channel

To select whether calculate the flux in the channel

1. Press or to move the cursor to “Flow channel No.”.
2. Press or to select Yes or No.

2. Flow type

Two flux calculating models are available, Model 1: $Q = K\sqrt{\Delta P \rho}$ and model 2: $Q = I_f * \rho / K$, model 1 is suit for the throttling flow meter, which need to extract the differential pressure signal; model 2 is suit for the flow transmitter without extraction, like vortex flow meter, turbine flow meter and electromagnetic flow meter.

In the formula,

Q: Mass flow;

K: Instrument Coefficient;

ρ : Standard Fluid Density

Δ P: The input value of differential pressure

I_f: The value of standard signal output from the flow transmitter.

3. K Instrument Coefficient K

The instrument coefficient K can be obtained by reverse-calculate the flux model by the signal and according flux. For example, in flux model 1, the formula if:

$$K = \frac{Q}{\sqrt{\Delta P \ \rho}}$$

In flux model 2, the formula to calculate K is:

$$K = \frac{I_f * \rho}{Q}$$

For example, the boiler of a thermo-power plant produces steam, applied the throttle flow meter to measure the steam flux, the range of differential pressure signal is 0～40.0kPa, of flux is 0～5000Kg/h, working temperature is 230℃, pressure is 0.4MPa, density is 1.7513Kg/m3, the compensating type is over-heat steam. Calculating K as follows:

$$K = \frac{Q}{\sqrt{\Delta P \ \rho}} = \frac{5000}{\sqrt{40 * 1.7513}} = 597.4$$

For model 2, for example, applied the turbine flow meter to measure a gas, output signal is 4～20mA, range of flux is 0～3000m3/h, fluid density is 0.840Kg/m3

$$K = \frac{I_f * \rho}{Q} = \frac{3000 * 0.840}{3000 * 0.840 / 1000} = 1000(\mathrm{t/h})\ ;$$

Calculate K by the above two formulas, and set as follows:

1. Press or to move the cursor to “Coefficient K”
2. Press or to configure K.

4. Flow unit

1. Press or to move the cursor to “flow unit”
2. Press or to select.

5. Density

In order to transform the gas volume under working condition to standard condition after temperature and pressure compensating, the density under standard condition(20℃, 0.10136MPa) need to be set. For measuring gas, we do not need to

configure the standard densityρ , because the steam compensating is calculating the mass flow by checking table.

1. Press or to move the cursor to “density”;
2. Press or to configure the density.

6. Range Low
   1. Press or to move the cursor to “Range L”
   2. Press or to input.
7. Range High
   1. Press or to move the cursor to “Range H”
   2. Press or to input.

> Notice
> Long press or at “Coefficient K”, “density”, “Range L”, “Range H”, the variation of inputting data will become faster. Press to modify the decimal digits.

8. Compensating method

As shown in figure 5.29:

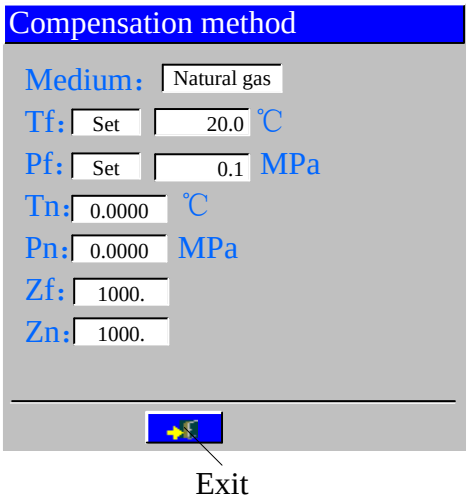


Figure 5.29 compensating method configure.

◆ Medium

Under different temperature and pressure, the density of fluid is different, in order to transform it to the volume flow or mass flow under standard condition, it is necessary to compensate its temperature and pressure.

According to different fluid medium, you can choose general gas, over-heat steam, saturation stream, natural gas, or no compensating. In which the meaning of every compensating types are as following:

■ General gas

The compensating target of general gas is to transform the volume under working condition into the volume under standard condition. The state formula of

general gas suits for the ideal gas state formula, the relationship between the density under working condition ρ_1 and normal density ρ fits for the following formula:

$$\rho_1 = \rho * \frac{(273.15 + T_0)(0.10136 + P_i)}{(273.15 + T_i)(0.10136 + P_0)}$$

For flux model 1, the compensating formula is:

$$Q_v = \frac{K\sqrt{\Delta P * \rho_1}}{\rho} = K\sqrt{\frac{\Delta P * \frac{(273.15 + T_0)(0.10136 + P_i)}{(273.15 + T_i)(0.10136 + P_0)}}{\rho}}$$

Where, Q_v is volume flow, T0＝20℃, P0＝0MPa

For flux model 2, the compensating formula is:

$$Q_v = I_f * \frac{(273.15 + T_0)(0.10136 + P_i)}{(273.15 + T_i)(0.10136 + P_0)} / K$$

Where, QV is volume flow, T_0 ＝20℃, P_0 ＝0MPa

- Saturated Steam

  The objective of saturated steam is to obtain the mass flow.

  Obtain the working condition density by checking the saturated steam pressure density table, to achieve pressure compensation. The density of fluid configuration is useless, the density ρ in flux model 1 and model 2 is the working condition density obtained by checking the saturated steam pressure density table by actual pressure.

  For model 1, the compensating formula is:

$$Q_m = K\sqrt{\Delta P \rho_1}$$

  For model 2, the compensating formula is:

$$Q_m = I_f * \rho_1 / K$$

  Where, Q_m is the mass flow, ρ_1 is the working condition density, obtained by checking the saturated steam pressure density table.

- Over-heated steam

  The objective of over-heated steam is to obtain the mass flow.

  Obtain the working condition density by checking the over-heat steam pressure density table, to achieve temperature and pressure compensation. The density of fluid configuration is useless, the density ρ in flux model 1 and model

2 is the working condition density obtained by checking the over-heat steam pressure density table by actual pressure.

For model 1, the compensating formula is:

$$Q_m = K\sqrt{\Delta P \rho_1}$$

For model 2, the compensating formula is:

$$Q_m = I_f * \rho_1 / K$$

Where, Q_m is the mass flow, ρ_1 is the working condition density, obtained by checking the table.

- Natural gas

The objective of natural gas compensation is to transform the volume flux under working condition to normal condition.

The state formula suits for the ideal gas state formula, the working density the compensating target of general gas is to transform the volume under working condition into the volume under standard condition. The relationship between the density under working condition ρ_1 and normal density ρ fits for the following formula:

$$\rho_1 = \rho * \frac{(273.15 + T_0)(0.10136 + P_i)}{(273.15 + T_i)(0.10136 + P_0)}$$

For flux model 1, the compensating formula is:

$$Q_v = \frac{K\sqrt{\Delta P * \rho_1}}{\rho} * \frac{Z_f}{Z_n} = K\sqrt{\frac{\Delta P * \frac{(273.15 + T_0)(0.10136 + P_i)}{(273.15 + T_i)(0.10136 + P_0)}}{\rho}} * \frac{Z_f}{Z_n}$$

Where Q_v is volume flow, $T_0 = 20℃$, $P_0 = 0Mpa$, Z_f is the compression coefficient under working condition, Z_n is the compression coefficient under normal condition。

For flux model 2, the compensating formula is:

$$Q_v = I_f * \frac{(273.15 + T_0)(0.10136 + P_i)}{(273.15 + T_i)(0.10136 + P_0)} * \frac{Z_f}{Z_n} / K$$

In which Q_v is volume flow, $T_0 = 20℃$, $P_0 = 0Mpa$, Z_f is the compression coefficient under working condition, Z_n is the compression coefficient under

normal condition。

- The temperature under working condition Tf

The temperature under working condition is used to decide the temperature under the given working condition. The instrument provides two methods of “External” and “Set”. The sampling channel under working temperature has to be set under “External”, and the temperature is fixed if choose “Set”.

1. Press or to move the cursor to “The temperature under working condition Tf”
2. Press or to select “External” or “Set”.
3. If select “Set”, move the cursor to right side to configure the temperature. If select “External”, move the cursor to right side to configure the Channel number .

- The pressure under working condition

The pressure under working condition is used to decide the pressure under the given working condition. The instrument provides two methods of “External” and “Set”. The sampling channel under working pressure has to be set under “External”, and the pressure is fixed if choose “Set”.

1. press or to move the cursor to “The pressure under working condition Pf”
2. Press or to select “External” or “Set”.
3. If select “Set”, move the cursor to right side to configure the pressure. If select “External”, move the cursor to right side to configure the Channel number.

- Standard temperature Tn

The standard temperature is the corresponding temperature of volume flow after compensation. When the result is volume flow, the rated temperature should be set by the user. The calculating result is unrelated to the standard temperature

1. Press or to move the cursor to “standard temperature Tn”
2. Press or to input

- Standard pressure Pn

The standard pressure is the corresponding pressure of volume flow after compensation. When the result is volume flow, the rated pressure should be set by the user. The calculating result is unrelated to the standard pressure

1. Press or to move the cursor to “standard pressure Pn”
2. Press or to input.

- Compressing coefficient Z_f

Compressing coefficient Z_f refers to the compressing coefficient under working condition, only available when the medium is natural gas.

1. Press or to move the cursor to “Compressing coefficient Z_f “
2. Press or to input.

- Compressing coefficient Z_n

Compressing coefficient Z_n refers to the compressing coefficient under standard

condition, only available when the medium is natural gas.

1. Press or to move the cursor to "Compressing coefficient Z_n "
2. Press or to input.

Notice

Long press or at "standard temperature Tn", "standard pressure Pn", "Compressing coefficient Z_f ", "Compressing coefficient Z_n ", the variation of inputting data will become faster. Press to modify the decimal digits.

9. Square Root

The Square Root function is generally applied to the process of flow signals like Orifice throttling. If the signal is greater than 5%, the precision of Square Root is greater than 0.2%.

1. press or to move the cursor to "Square Root"
2. Press or to select Yes or No.

5.3.8.3 PID Algorithm

PID algorithm configuration is as shown in figure 5.30.

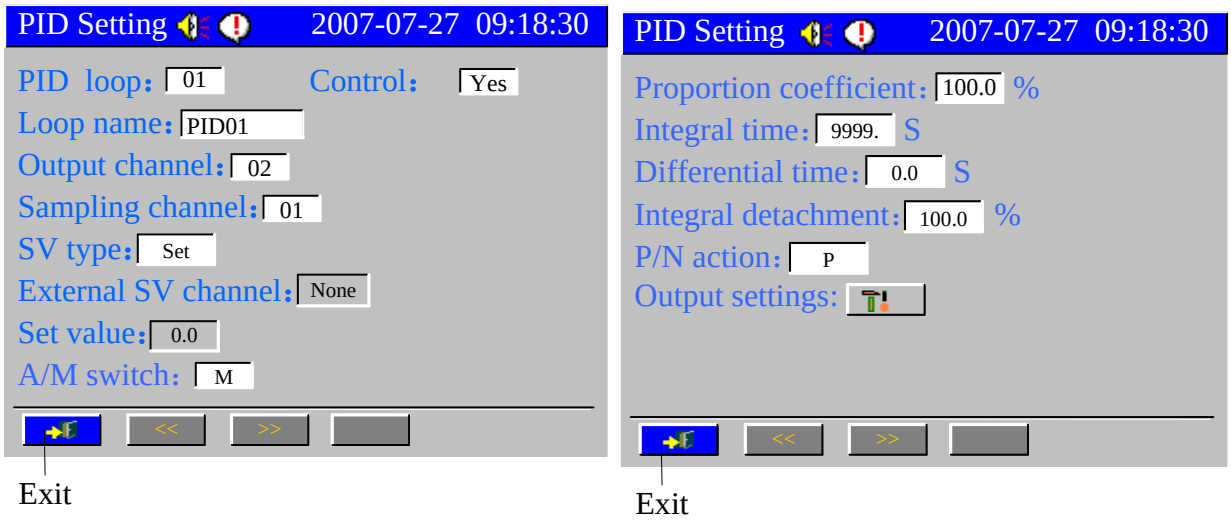


Figure 5.30 PID Channel Configuration Screen

1. PID Loop
   1. Press or to move the cursor to "PID Loop"
   2. Press or to select the loop.
2. Loop control
   1. Press or to move the cursor to "Loop control"
   2. Press or to select whether to enable the loop.
   3. The following parameters can be modified only if the loop control is "Yes".
3. Loop name
   1. Press or to move the cursor to "Loop name"
   2. Press to enter the loop name setting, and the operation is the same as Location Label modification

4. Output channel

   The type of output channel has to be AO.

   1. Press or to move the cursor to “Output channel”
   2. Press or to select.

5. Sample channel

   1. Press or to move the cursor to “Sample channel”
   2. Press or to select the sample channel according to PID.

6. Set value method

   1. Press or to move the cursor to “SV type”
   2. Press or to select internal given or external given.

7. external set method

   If select the external set method, the external given channel will be valid to achieve dynamic control.

   1. press or to move the cursor to “External SV channel”
   2. Press or to select external given Channel Label.

8. setting value

   If the given method is internal given, user can set the value under automatic configuration mode, the setting value is in the range of sampling.

   1. press or to move the cursor to “set value”
   2. Press or to increase or decrease the value.

9. Proportion coefficient

   1. Press or to move the cursor to “proportion coefficient”
   2. Press or to increase or decrease the value.

10. Integral time

    1. Press or to move the cursor to “Integral time”
    2. Press or to increase or decrease the value.

11. Differential time

    1. Press or to move the cursor to “Differential time”
    2. Press or to increase or decrease the value.

12. Integral detachment

    When error ≤ integral detachment coefficient × range, integral takes effect; Otherwise integral will be detached (doesn’ t take effect). The range of integral detachment coefficient is 0.0-100.0%.

    1. press or to move the cursor to “Integral detachment”
    2. Press or to increase or decrease the value.

13. Positive and negative effect

    1. Press or to move the cursor to “P/N action”
    2. Press or to select.

14. A/M switch

    A/M switch can switch between automatic and manual.

    1. press or to move the cursor to “A/M switch”
    2. Press or to select.

PID Working Mode

1) Manual PID output: select "Manual" in the manual/automatic switch (Or select M in the A/M of configuration screen.)and set value at MV;
2) Fixed PID control: select "Automatic" in the manual/automatic switch, "internal given" in the given mode, and input the value;(need 1 input channel, 1 output channel of hardware support);
3) Dynamic PID control: Select "Automatic" in the manual/automatic switch, "external given" in the given mode, and the channel number of following objects in the external given channel. When the setting value is not available.(need 2 input channels, 1 output channel of hardware support);

15. Output settings

Output settings are used to configure the parameters of output values, as shown in figure 5.31, includes higher limit, lower limit, Original value, fixed value, output dead zone, etc.

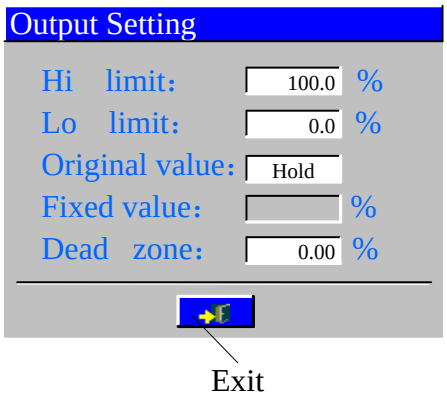


Figure 5.31 Output Setting Screen

- Output higher limit

  If the operation result of the regulator is greater than the limit, the actual output is the upper limit. Its range is 0.1%-100.0%.

  1. Press or to move the cursor to "Hi limit"
  2. Press or to increase or decrease the limit.

- Output lower limit

  If the operation result of the regulator is smaller than the limit, the actual output is the lower limit. Its range is 0.0%-99.9%.

  1. Press or to move the cursor to "Lo limit"
  2. Press or to increase or decrease the limit.

- Original value

  The value sets the output of first use of the regulator. There are two options: fixed value-the specified value in "Hold"; maintain-maintain current output value.

  1. Press or to move the cursor to "Original value"
  2. Press or to select.

- Fixed value

The value is available only if the “Original value” is “fixed value”. The range is 0.0%-100.0%.

1. Press or to move the cursor to “Fixed value”
2. Press or to increase or decrease the value.

◆ Output dead zone

In order to avoid the systematic instability resulted from frequent variation of devices, the output dead zone is to be set. When the incremental value of output signal is litter than output dead zone, it will not wok, the output doesn’t change.

1. Press or to move the cursor to “output dead zone”
2. Press or to increase or decrease the value

5.3.8.4 Transmitting algorithm

Transmitting algorithm configuration screen is as shown in figure 5.32

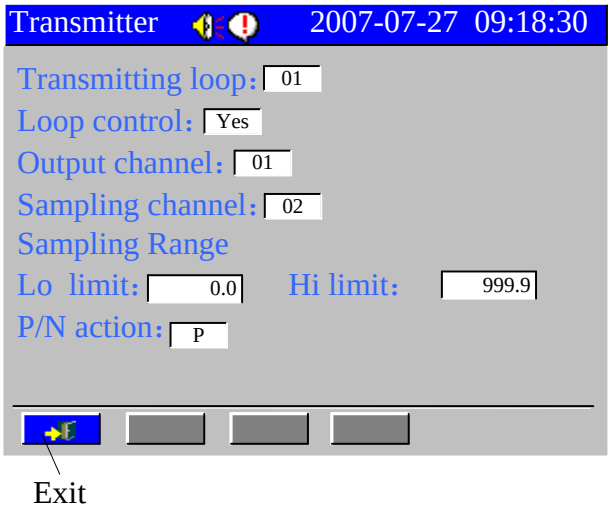


Figure 5.32 Transmitting configuration screen

1. Transmitting Loop
   1. Press or to move the cursor to “Transmitting Loop”
   2. Press or to select the loop.
2. Loop control
   1. Press or to move the cursor to “Loop control”
   2. Press or to select the loop. If select yes, the loop will open, otherwise it will close the loop.
3. Output channel

   The output channel must be AO channel.
   1. Press or to move the cursor to “Output channel”
   2. Press or to select the channel.
4. Sample channel

   It refers to which channel to transmit to.
   1. Press or to move the cursor to “Sample channel”
   2. Press or to select the required channel.
5. Lower limit

   Set the lower limit of sample channel measuring range:
   1. press or to move the cursor to “Lo limit”

2. Press or to configure.

6. Higher limit

Set the Higher limit of sample channel measuring range.

1. Press or to move the cursor to “Hi limit”
2. Press or to configure.

7. Positive and negative action

Under positive effect, the maximum output should be 100% according to upper measuring limit, the minimum is 0%.

Under negative effect, the minimum output should be 0% according to upper measuring limit, the maximum is 0%.

1. Press or to move the cursor to “P/N action”
2. Press or to select positive or negative.

Notice

AO transmitting configuration must be done after the completion of corresponding sample channel configuration. After transmitting configuration, if the corresponding sampling channel needs to be configured, then AO transmitting also need to be configured again.

5.3.9 Display configuration

As shown in figure 5.33.

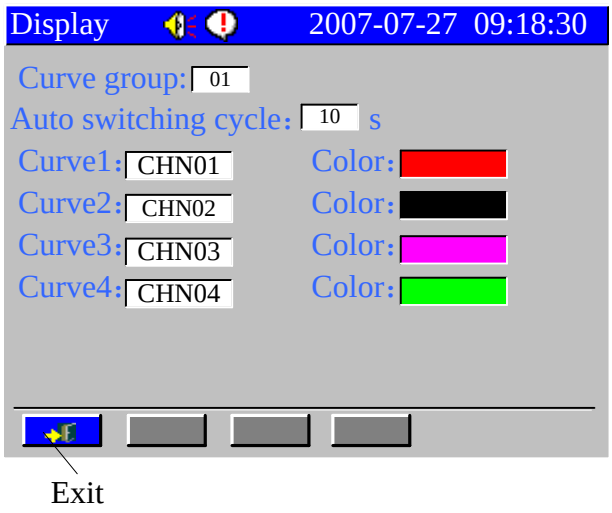


Figure 5.33 Display configuration

1. Curve group

Every group includes four curves. The curves can be combined according to requirement, and display in the real time trend and historical trend.

1. Press or to move the cursor to “curve group”
2. Press or to configure.

2. Automatic switching cycle

It refers the automatic switch of curve groups in the screens of real-time trend, digital display, and bar chart.

1. Press or to move the cursor to “Automatic switching cycle”
   2. Press or to configure.
   3. Curve
      Select the channel No. requires to be displayed
      1. press or to move the cursor to “curve 1”, “curve 2”, “curve 3” or “curve 4”
      2. Press or to select the channel No.
   4. Color
      1. Press or to move the cursor to “color”
      2. Press or to select the color.

5.3.10 Data backup

ZYW130-RG Chartless Recorder is able to transfer the historical data to USB disk, and input the data on USB disk to the host computer, and undertake data analysis, table display, printing by the according management software on host computer.

The data backup screen is as shown in figure 5.34.

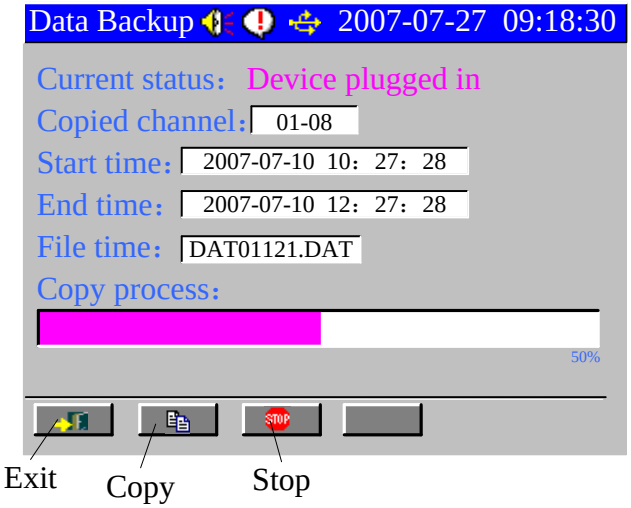


Figure 5.34 Data backup screen

Before insert USB disk, please make sure the disk is not written protected.

After the USB disk is inserted, the instrument will self-check the disk, if “current status” is “Device plugged in”, it means the USB disk is supported by the instrument. Otherwise if the “current status” is “device is not exist” means that the USB disk is not supported. Please check whether the USB disk is specified types of disk by our company.

1. Copied channel
   1. Press or to move the cursor to “Copied channel”
   2. Press or to select the starting and ending channel.
2. Start time
   1. Press or to move the cursor to “Start time”
   2. Press or to set the starting time for every channel.
3. End time
   1. Press or to move the cursor to “End time”
   2. Press or to set the ending time for every channel.
4. File name setting

Select the file name of the backup data in the USB disk.

1. Press or to move the cursor to “File name”
2. Press to the filename modification screen, as shown in figure 5.35.

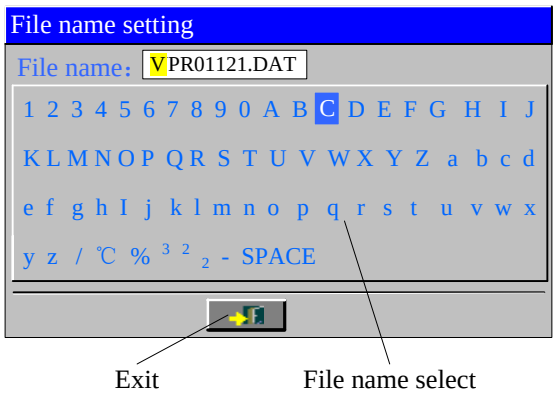

File name setting
File name: VPR01121.DAT
1 2 3 4 5 6 7 8 9 0 A B C D E F G H I J
K L M N O P Q R S T U V W X Y Z a b c d
e f g h I j k l m n o p q r s t u v w x
y z / ℃ % ³ ² ₂ - SPACE
Exit
File name select

Figure 5.35 file name setting

5. Copy process

   Through observing the backup process bar, the user can understand the process of data backup.

6. Function keys
   1. [Exit]: Exit the data backup screen;
   2. [Copy]: Start the data backup;
   3. [Stop]: Stop data backup.

5.3.11 Data printting

As shown in figure 5.36:

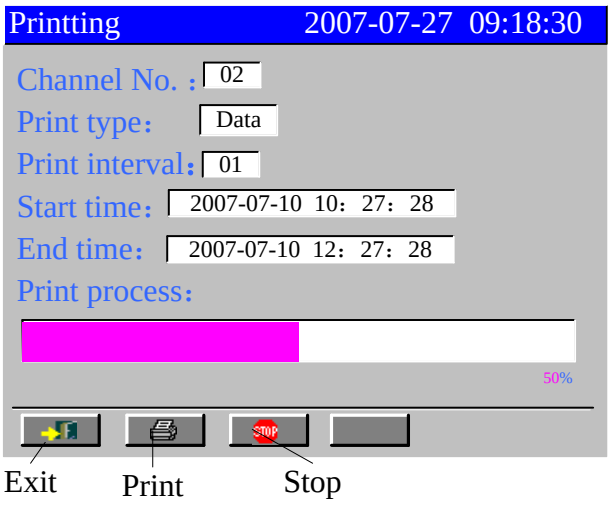
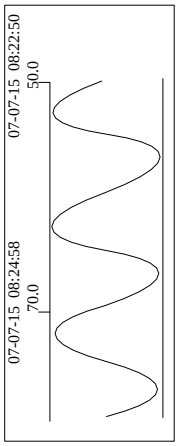


Figure 5.36 data printing

1. Channel number.
   1. Press or to move the cursor to “Channel No.”
   2. Press or to select the channel label need to be printed.
2. Printing type

   The printing types include curve and data, which is printing the record by curve or

data. The curve effect is as shown in figure 5.37, which prints date, time and engineering value every 128 points. If the record interval is 1S, the interval of every two points is 2 minutes 8 seconds. The data effect is as shown in figure 5.38; the items are channel label, date, time, and engineering value from left to right.



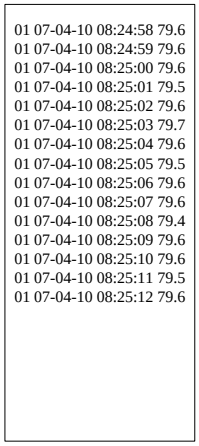


Figure 5.37 Curve Printing Figure 5.38 Data Printing

3. Printing interval
   1. Press or to move the cursor to “Print interval”
   2. Press or to select the interval.
4. Starting time

   The print time includes starting time and ending time, during the period, the point is printed according to the record intervals from starting time to ending time.
   1. Press or to move the cursor to “start time”
   2. Press or to configure.
5. Ending time
   1. Press or to move the cursor to “end time”
   2. Press or to configure
6. Function keys
   1. [Exit]: Exit data printing screen.
   2. [Print] Start printing after the printing type, starting time and ending time is set.
   3. [Stop]: during the printing process, if user wants to stop printing, it can be done manually. Press [F3] and printing stopped.

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